Traffic Engineering

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Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

COVER: Artist's drawing of the proposed interchange of the John C. Lodge and Edsel Ford Expressways in Detroit.

Photo by: Smith Brothers Detroit, Michigan

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LETTERS TO THE EDITORS

GENERAL

The October issue of "Traffic Engineering" just reached my desk this morning and I have spent the last hour in going through it thoroughly.

I would be terribly remiss if I did not extend my congratulations to you and the Institute on the enlarged edition, and the greatly increased amount of fine material it contains.

It is only another evidence of the progressive spirit of the Institute. Best wishes for this publication's continued and growing success.

Julien Harvey
Manager

Accident Prevention Dept.
Association of
Casualty & Surety Companies
New York City

Just received a copy of "Traffic Engineering" magazine. The new format is excellent. I think that it should help boost subscriptions and advertising considerably.

Harold F. Hammond
Manager
Transp. and Comm. Dept.

U. S. Chamber of Commerce
Washington, D. C.

I want to take this opportunity to extend to you my sincere congratulations for the greatly improved ITE magazine—"Traffic Engineering". In glancing through the October issue and noting the increase in the number and extent of the feature articles, as well as the additional illustrations accompanying them, I feel that our magazine is on a par with similar magazines of the founder engineering societies, as well as other well-known engineering publications.

I should like to add that the editorial by President Smith was most appropriate for the initial appearance of the greatly improved magazine.

Edward G. Wetzel
Highway Analyst

Port of New York Authority
New York City

We have for acknowledgement your letter advising of the increase in subscription rates.

For our part, we feel that this is still very much of a bargain and concur very definitely with the increase you have made.

E. T. Curlette
President

North American
Distributors, Ltd.
Calgary, Alberta, Canada

The first issue of "Traffic Engineering" magazine in the new and larger size impressed me at first sight with its beauty and dignity. I was naturally quite proud of the new official publication of the Institute of Traffic Engineers as were probably all ITE members as soon as they received it.

Recently, on two occasions, I visited with two editors of different engineering publications and took the opportunity to show both gentlemen my copy of the magazine. Both men examined the publication carefully and they, too, were much impressed. Both had complimentary remarks to make about everything from the editing to the economics of the publication—its content and format, the type, its readability, the cover and the advertising matter.

Congratulations on getting "Traffic Engineering" off to such a splendid new start.

Nathan Cherniack
Economist

Port of New York Authority
New York 11, N. Y.

● **We greatly appreciate these notes of congratulations. We will also be pleased to publish letters of constructive criticism. ED.**

PENTAGON ROAD NETWORK

Please inform me of the official title of the Pentagon Building road network studies mentioned in "Signs of the Times", pg. 565, Traffic Engineering, September 1949.

How may copies of the Pentagon Building studies be procured?

S. A. Heenan

American Gas Accumulator Co.
Chicago, Ill.

● **The Pentagon Building Road Network Study mentioned on page 565 of the September issue of "Traffic Engineering" referred to a paper entitled "Design of Signs for the Pentagon Road Network" by D. W. Loutzenheiser, published on page 206 of the 1943 Proceedings of the Highway Research Board.**

If you do not have access to the Proceedings, I suggest you either contact the Highway Research Board, 2101 Constitution Avenue, Washington 25, D. C., or Mr. D. W. Loutzenheiser, Chief, Design Development Section Dept. of Design, U. S. Bureau of Public Roads, Washington 25, D. C.—ED.

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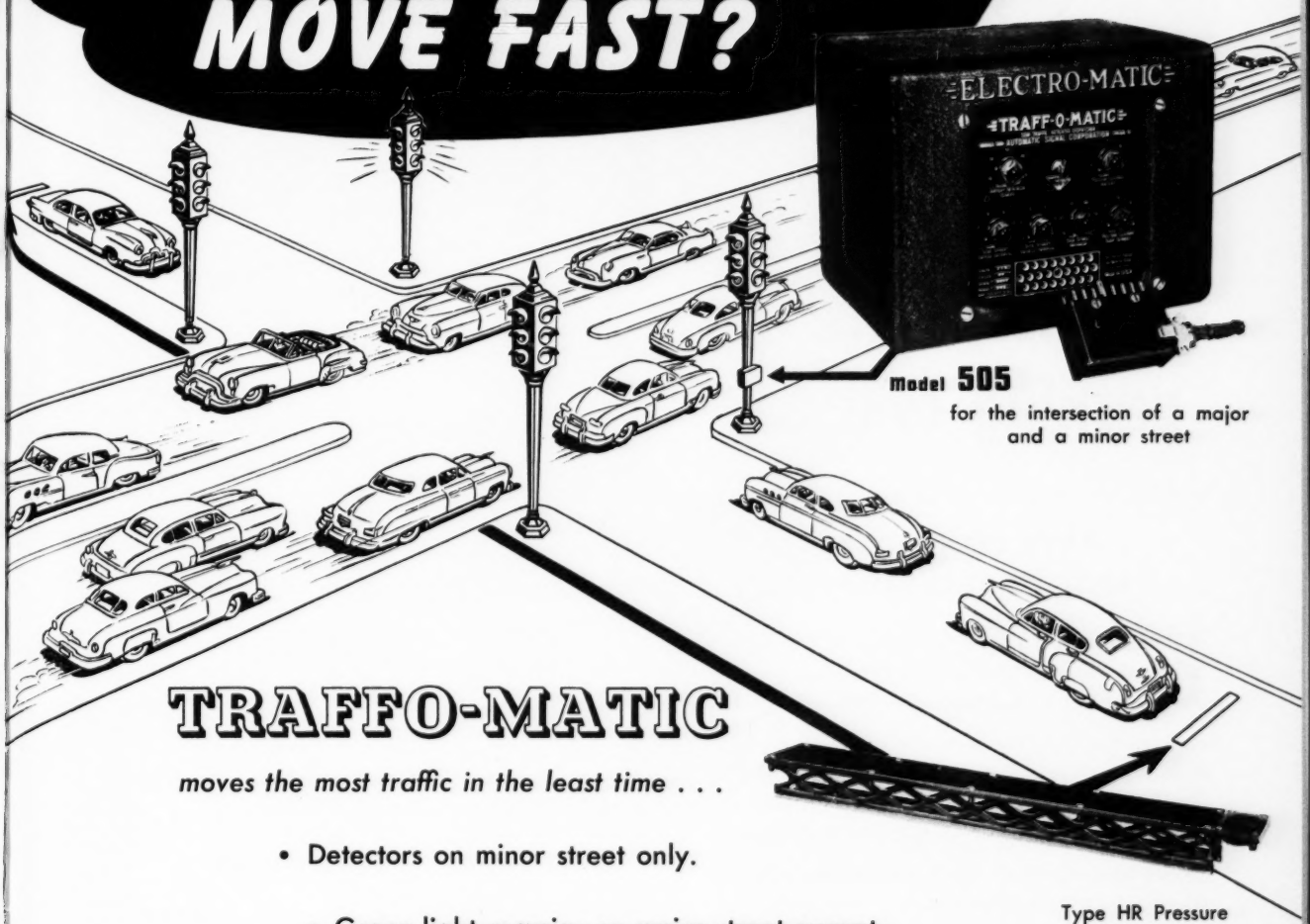

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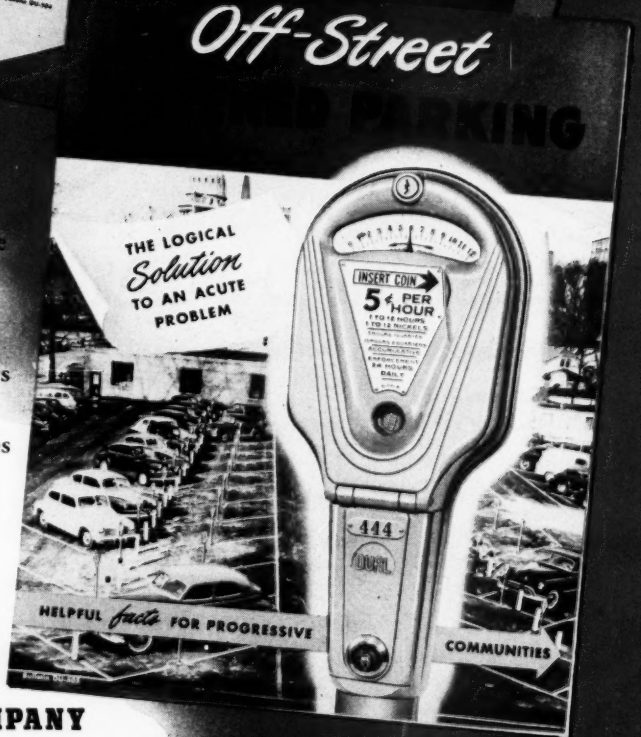

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Frankly Speaking

What does the future hold for the traffic engineering profession? The answer lies to a large extent with the traffic engineer himself.

The demands of automotive transportation for more efficient operation of street and highway facilities gave birth to the profession of traffic engineering. The profession has grown from a lusty infant through the growing pains of adolescence to its present stature as a young but stalwart and vigorous adult. What it becomes in the future depends on the contributions of the members of the profession, individually, and collectively through the Institute of Traffic Engineers, to the improvement of motor vehicle transportation.

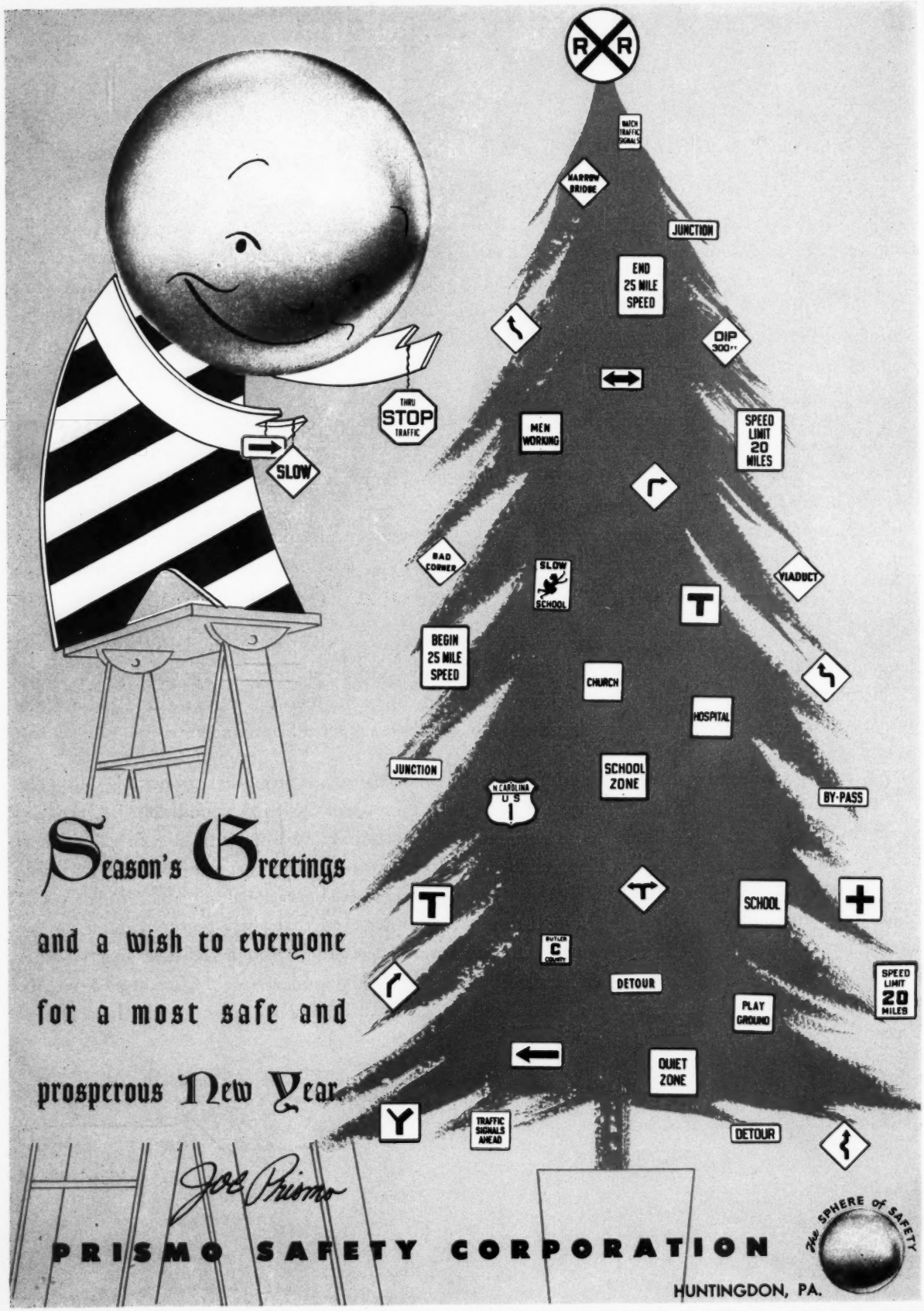
There is need for the modernization of our streets and highways and terminal facilities to meet the needs of present day and estimated future traffic. However, even if funds were available for the immediate construction of the most optimistic street and highway improvement program, it will still be years before most of our present highway facilities can be brought up to desired standards. There will remain for several years many miles of streets and highways unsuited to modern traffic needs on which every possible provision must be made for the safety, comfort, convenience, and fluidity of traffic flow. Existing streets and highways must be utilized to the best advantage.

The need for new and improved motor vehicle transportation and terminal facilities and the demands for improved operation of existing facilities provide an unlimited opportunity for traffic engineering to demonstrate its value. However, this opportunity can be fully realized only if the public is informed of the important functions and possibilities of traffic engineering.

Traffic engineering must be sold in much the same manner as any other product is sold. The traffic engineer must be able to demonstrate what his product will do for the consumer, i.e., the motoring public. To do this he must be more than a mere technician. He must be able to sell his ideas to his superiors and to the public. The traffic engineer must understand that the problems of traffic management involves not only highway planning and design and operational control through traffic regulation and traffic control devices, but he must also understand that these factors cannot be isolated from the problems of influencing public opinion and legislation; for in the final analysis what is done to improve traffic conditions stems from public psychology and desire. To accomplish results, the traffic engineer must not only be a trained and experienced technician but must also have an appreciation of the value of public relations.

Henry E. Riggs

Vice-President


R R
WATCH TRAFFIC SIGNALS
NARROW BRIDGE
JUNCTION
END 25 MILE SPEED
DIP 300'
THRU STOP TRAFFIC
SLOW
MEN WORKING
SPEED LIMIT 20 MILES
BAD CORNER
SLOW SCHOOL
VIADUCT
BEGIN 25 MILE SPEED
CHURCH
HOSPITAL
JUNCTION
N CAROLINA US 1
SCHOOL ZONE
BY-PASS
SCHOOL
BUTLER C COUNTY
DETOUR
PLAY GROUND
SPEED LIMIT 20 MILES
QUIET ZONE
TRAFFIC SIGNALS AHEAD
DETOUR
Season's Greetings
and a wish to everyone
for a most safe and
prosperous New Year
Joe Prismo
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Capacity Determinations Simplified

By H. G. ECKHARDT (Mem., ITE)*

Assistant Chief Traffic Engineer, Ohio Department of Highways

THE State of Ohio, like several other progressive commonwealths, determined about a year ago to seek out the facts of its street and highway needs so that its respective political subdivisions could learn the nature and extent of the over-all transportation problem.

To implement the tremendous task of learning those facts, the Ohio Highway Study Committee was formed. This legislative group, in turn, formulated a plan whereby a strictly technical organization would be established to secure the basic facts, analyze them and present them in concentrated form. The Committee requested the Automotive Safety Foundation to loan staff engineers to direct the Engineering Study. G. Donald Kennedy is Consultant to the Committee, J. P. Buckley is Chief Engineer and C. F. McCormack is Supervising Engineer. With all pertinent data before the Committee, it then is expected to utilize the information and recommend an immediate and long-range corrective program of street and highway development.

The survey in Ohio is, in many respects, similar to those pursued in other States, with this difference—this investigation is being made with stronger emphasis on traffic operations. The operations angle in preceding studies has by no means been slighted but in the instance of Ohio this fundamentally important phase has been made the underlying theme of the appraisal of adequacies.

The author had the privilege of serving as the first Staff Engineer and was assigned the job of developing criteria and yardsticks for measurements including those of "capacities". He also was required to enumerate and describe the traffic engineering techniques applicable to streets and highways in order to gain more efficient usage of existing facilities. This work was aided by the active cooperation of a "Traffic Engineers Advisory Committee" consisting of the following:

Harry E. Neal, Chairman and Chief Traffic Engineer, Ohio Department of Highways
William E. Billings, Traffic Engineer, Cleveland Auto Club
Guy Elbin, Franklin County Engineer
George W. Howie, Traffic Engineer, Cincinnati, Ohio
Albert Porter, Cuyahoga County Engineer
Paul S. Robinette, Traffic Engineer, Toledo, Ohio

It was learned quite early that the chief source of dependable information on capacities was contained in the Highway Research Board Committee's report prepared largely through detailed research by O. K. Normann of the Bureau of Public Roads. It was also readily understood that if the thousands of roads and streets in the State of Ohio were to be uniformly appraised as to capacity, a relatively simple and time-saving method would have to be used.

Hence it fell to the Staff Traffic Engineer to "boil down" and generalize upon the detailed study referred to above so that the city, county and state engineers in the field would have a comparatively quick and yet substantially accurate method for increasing their respective facilities.

Rural Road Capacities

In the case of rural highways, basic values were selected each of which are subject to reduction due to such variables as commercial composition, terrain, sight distance and the number and width of lanes. These "basic" values were selected upon the following assumptions: (a) that sight distance is adequate; (b) that lanes are 12 feet wide; (c) that adjacent shoulders are adequate; (d) that speeds of 45 to 50 miles per hour generally may be maintained and (e) there are no trucks. Following are the selected "basic" values:

1.	For two-lane roads	900 vehicles per hour
2.	For three-lane roads	1500 vehicles per hour
3.	For four-lane roads	3000 vehicles per hour
4.	For multilane expressways	4500 vehicles per hour*

*Computed on basis of 35 to 40 m.p.h.

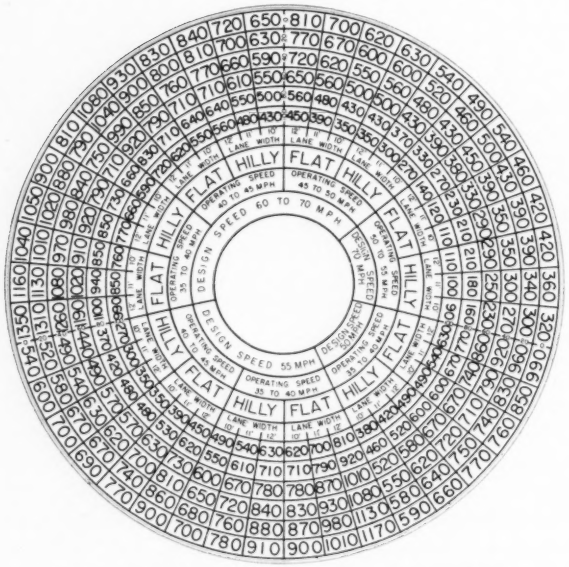
The foregoing basic (or "possible") capacities were then reduced for the several conditions described above. Such reductions were accomplished by the application of carefully developed factors borrowed from Mr. Normann's research report. One of the accompanying circular charts shows the resultant net capacity values for two-lane rural roads. Traffic volumes greater than these could be achieved only by a reduction in the safe operating speeds. Generally, the observed capacities for three-lane roads under similar conditions have been one and two-thirds times the values shown for two-lane roads. However, there is considerable justifiable doubt that three-lane roads can carry those volumes of vehicles without producing unreasonable numbers of accidents. In appraising Ohio's road needs the capacity values for three-lane roads were arbitrarily lowered to one and one-half times the capacity of two-lane roads. The capacity of a four-lane rural road is not affected by the availability of passing distance as are the capacities of two-lane and three-lane rural roads. The values for four-lane rural road capacities at operating speeds of 45 to 50 miles per hour vary from 1500 vehicles

*Mr. Eckhardt has been on leave of absence to function as Staff Traffic Engineer for the Ohio Highway Study Committee.

per hour on 9′ lanes in hilly territory and with 20% commercial vehicles, to 2900 vehicles per hour on 12′ lanes in level terrain and with less than 10% commercial vehicles.

PRACTICAL WORKING CAPACITIES
FOR TWO-LANE RURAL ROADS

IN TERMS OF VEHICLES PER HOUR IN TWO DIRECTIONS


DESIGN SPEED 60 TO 70 MPH
DESIGN SPEED 55 MPH
OPERATING SPEED 40 TO 45 MPH
OPERATING SPEED 45 TO 50 MPH
OPERATING SPEED 35 TO 40 MPH
LANE WIDTH 9' OR LESS
LANE WIDTH 10' TO 11'
LANE WIDTH 12' OR MORE
HILLY
FLAT

Commercial Vehicles are those with Dual Tires

ADDITIONAL CALCULATIONS

1. **Values given are vehicles per hour (both directions) and include 10% Commercial Vehicles.**
2. **If Commercial Vehicles vary from 10% in FLAT terrain, add or subtract 1% for each 1% of Commercial Vehicles over or under 10%.**
3. **If Commercial Vehicles vary from 10% in ROLLING terrain, add or subtract 3% for each 1% of Commercial Vehicles over or under 10%.**
4. **0,20,40,60,80,100 refer to per cent of roadway having LESS than 1,500 feet passing sight distance.**

Two-Way Urban Street Capacities

Urban street capacities are subject to considerably more complexities than are those in rural areas. Among the more important factors that tend to influence a given street's capacity are: (a) width of street and number of lanes, (b) curb parking, (c) general location, (d) composition of traffic and (e) turning movements. Street capacities are also affected by the existence of regularly scheduled mass transit lines. Near side and far side bus stops and safety zones have an influence on the carrying ability of a given street.

In urban communities the intersection plays a very important part in the ability of a street to carry vehicular traffic; in fact, the entire subject of urban street capacities is predicated upon intersection influence. The primary factors evaluating the ability of an intersection to clear traffic are: (a) units of time, (b) units of width and (c) number of vehicles. Combined, these factors permit the expression of traffic flow in relation to time and surface width.

On the circular charts for urban street capacities can be found capacity values for the several combinations of the following variables:

1. Location (Downtown, Intermediate, Outlying)
2. With and without curb parking
3. Commercial Vehicles (0 to 5% and 5 to 15%)
4. Left Turning Movements (Permitted and prohibited)
5. Width of streets ranging from 30 feet to 80 feet (curb to curb)

The circle for two-way streets is divided into three segments, one each for a "Downtown" area, an "Intermediate" area and an "Outlying" area. Each of those segments is subdivided into two smaller segments, one each for streets where curb parking is permitted and for streets where parking is prohibited. Two further subdivisions are provided yielding segments for commercial vehicle composition and for left turn movements, respectively. On the outer rim are six concentric circles in which are found capacity values for street widths ranging from 30 feet to 80 feet, inclusive.

As stated above, the values read from the chart represent the capacities for both directions of flow. The total flow figures are made up as follows:

1. For Downtown areas—55% one direction, 45% in other direction.
2. For Intermediate areas—60% one direction, 40% in other direction.
3. For Outlying areas—66⅔% one direction, 33⅓% in other direction.

If a given facility lies in a geographic position that could be termed "Outlying" with respect to the center of the city and yet is within an area that is predominantly commercial or business in character, that facility should be appraised under the category of "Intermediate" district.

Upon selection of a value from the chart for a given set of conditions, that value is subject to further factoring for:

1. The presence of a fixed-time traffic signal.
2. The presence of mass transit operations.
3. Commercial composition in excess of 15%.

These factors are described as follows: (1) In order to account for that portion of time that traffic is permitted to move through the intersection, a fraction must be applied. This fraction is:

$$\frac{\text{No. seconds of green}}{\text{No. seconds of cycle length}}$$

(2) If a bus line exists and loading or unloading is performed, the chart value must be reduced by 12% (or a multiplying factor of 0.88); if a street-car stop is involved, values should be taken from the chart under the segment for "Downtown district-parking permitted". (3) If commercial vehicles (dual tires) constitute over 15 per cent of total flow, the chart values (read from the 5-15% segment) must be multiplied by a factor equal to 1.00 minus the actual percentage commercial composi-

tion less 10 per cent (1.00 — (0.19 — 0.10) = 0.91).

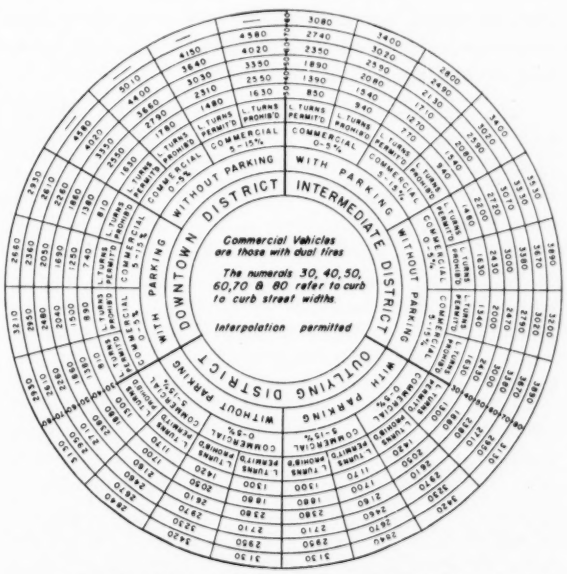
Example:

> A local engineer seeks to learn whether "Elm Street", "Main" to "Fourth" is over-capacitated. The Section is in an intermediate area, 44 feet wide, parking is prohibited, commercial vehicles constitute about 19 per cent of the flow. A fixed-time signal is within the section and it delivers 28 seconds of green indication out of each 50 second cycle and left turns are permitted.

The solution lies in first selecting that portion for "Intermediate District". Next, select the segment marked "Without Parking". Then through the segment marked "Left turns permitted" read the value 2200 from the circle labelled 40′. Interpolated for 44′, this value becomes 2420. This value must be multiplied by 28/50 (for the signal timing) and that product by 0.91 for the commercial traffic. The resulting rounded value of 1230 represents the practical working capacity for the entire street per hour. This in turn, indicates a capacity of 740 vehicles in one direction and 490 vehicles in the opposite direction.

PRACTICAL WORKING CAPACITIES FOR TWO-WAY STREETS

IN TERMS OF TOTAL VEHICLES PER HOUR



ADDITIONAL COMPUTATIONS REQUIRED

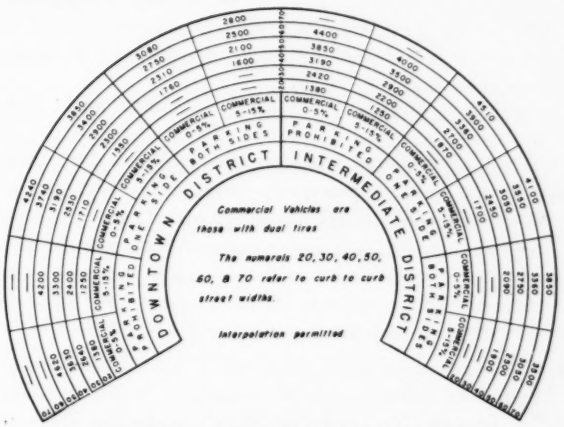
1. **If Commercial Vehicles exceed 15% of Total traffic—subtract from the value shown for 5-15% Commercial, 1% for each per cent of Commercial Vehicles over 15%.**
2. **If a Bus route—multiply final value by 0.88. If a Streetcar route, regardless of district, use values for "DOWNTOWN — WITH PARKING".**
3. **If fixed time signal is used, multiply by fraction**

$$\frac{\text{Seconds of Green}}{\text{Seconds of Total Cycle}}$$

If Streetcar turns—deduct time from seconds of Green.

PRACTICAL WORKING CAPACITIES FOR ONE-WAY STREETS

IN TERMS OF TOTAL VEHICLES PER HOUR


DOWNTOWN DISTRICT
INTERMEDIATE DISTRICT
Commercial Vehicles are those with dual tires
The numerals 20, 30, 40, 50, 60, & 70 refer to curb to curb street widths.
Interpolation permitted

ADDITIONAL COMPUTATIONS REQUIRED

1. **If Commercial Vehicles exceed 15% of Total traffic—subtract from the value shown for 5-15% Commercial, 1% for each per cent of Commercial Vehicles over 15%.**
2. **If a Bus route—multiply final value by 0.88. If a Streetcar route-regardless of district, use "DOWNTOWN—WITH PARKING".**
3. **If fixed time signal is used, multiply by fraction**

$$\frac{\text{Seconds of Green}}{\text{Seconds of Total Cycle}}$$

If Streetcar turns—deduct time from seconds of Green.

One-Way Urban Street Capacities

The chart for one-way streets is similar to the two-way street chart and can be used in the same manner.

It should be made clear that the author does not seek to substitute these "short-cut" devices for the more detailed and accurate determinations of capacity needed when designing a new street or highway. Instead, they were devised for appraisal of existing facilities and to provide a quick way to estimate the value of eliminating parking, changing left turn regulations, signal timing, etc., when considering the probable effect on the practical capacity of a given thoroughfare.

On two successive Saturdays, a 31-year-old Cincinnati resident used a Clark Street trolley coach as a sleeping car. The first time he slept four hours on the vehicle and later slept one full trip to Knowlton's Corner and back downtown. Then he was arrested and fined $25. Cincinnati Street Railway public relations officials suggested that the comfortable riding qualities of their new electric trolley coaches and the music provided by FM radio had lulled the man to sleep. The local transit officials now are pondering the advisability of charging hotel rates for any future sleepers. At least the charge would be less than $25.

Motorists Reaction to Portable School Signs

By JAMES T. WHITE (Assoc. Mem., ITE)

City Traffic Engineer, Evansville, Indiana

ARE school safety programs effective? Do they reveal any noted improvement since their inauguration? Who has the best pedestrian safety record, the oldsters or the youngsters? These few questions might well be answered in the affirmative in behalf of the youngsters and particularly those of grade school age groups and upwards to twenty-five years of age.

General pedestrian accident trends indicate that schoolchild traffic safety lessons are reaping an improved record year by year. Yet, there has been considerable laxity in uniform regulations for the motorist while driving through school zone areas during assembly and dismissal periods of the school day. But school children have, for the most part, received a well balanced safety training course.

Some communities permit non-standard signs to be used at school crosswalk locations. Others are of the opinion that portable facsimiles of school boys or girls and police officers do the job of protecting school children at these locations.

Another group will prefer to warn motorists by installing a permanent type of collapsible school sign at the side of the roadway and open the sign during school assembly and dismissal periods—requiring the motorist to stop at such locations.

Could it be that those who frown upon uniformity would take the preceding citations of non-uniform practices as an answer defending local option on traffic control? A program so conceived would, in a period of time, fall apart of its own weight. The flexibility of the automobile has brought about an awakening for the need of uniform traffic control and regulation. Alibis are becoming weaker and weaker year by year as some ignore the employment of traffic regulations and controls that have been tried and proven to such a degree as to become a part of recommended national practice of traffic control.

Let us not lose sight of the fact that we have traffic control measures that have been employed and are taken as gospel among many persons and motorists who are accustomed to these peculiar non-standard practices. Perhaps the most outstanding of local traffic control practices is that employed in a large eastern city where we are advised that oversized signals have been installed a considerable distance apart. Intermediate intersections have no signal installations and motorists may be stopped on the main street waiting for a green indication to be signaled from several blocks away while side street traffic is momentarily permitted to enter or cross the main street thoroughfare. In certain sections of Mexico, we find the motorists with the loudest horn and the most intestinal fortitude will gain the right-of-way through an intersection. Perhaps the examples such as these are workable in their own locality, but surely they have not proven themselves acceptable on a national basis. How long they may stand on their own merits is questionable.

Recently, we have become alarmed concerning our traffic problems. Prior to the close of the last World War, we found many persons in positions of authority that were complacent to the fact that traffic was becoming a problem and took little or no action to relieve the increasing tendency of more accidents and more congestion.

Evolution of Portable Signs

While serving as Traffic Engineer for the City of Fort Wayne, Indiana, it was possible for the traffic engineering department to conduct a study of the evolution of the portable school patrol standards leading to the present recommended practices prescribed in the recently revised Manual on Uniform Control Devices.

The school-boy patrol signs proved to be very impractical and experienced considerable damage due to motorists running into the signs. Colors were used to bring about a reasonable resemblance to that of a human child standing in the roadway as a warning to motorists that his fellow students were somewhere about and likely to be crossing the street. Often it was found that the colors used had a tendency to blend into certain backgrounds offering a likely camouflage and frequent destruction to the sign.

These signs, in addition to being a reasonable resemblance of a child, were supplemented with auxiliary messages to advise the motorist that he was within the area of a school zone or school crossing and that he was to stop or, in some few instances, to reduce his speed. It is well to point out that these signs in total did not conform to any standard practice and commanded a small percentage of obedience on the part of the motorists for their intended use.

It became necessary to dispose of the school patrol signs and inaugurate the use of portable signs that would more closely conform to accepted standard shapes and colors.

At this time the portable signs were mounted with the standard 18″ school crossing and stop signs. This step proved to be more effective than the former school patrol signs, but there still remained a problem in getting the motorists and school children to obey these signs.

From a motorist standpoint it was found that positive stops were not popular. This can better be appreciated when we recognize that the motorist was required to

make unnecessary stops at periods of the day when school children were not in the process of going to or from school. The use of the signs was in many cases very poorly supervised. Frequently they were rolled into the street for extensive periods prior to the opening and closing of schools and during the entire noon hour period.

A well recognized form of traffic regulation has been found to be one that is popular with the motorist. In addition to the weakness cited above, the revamped method of school crossing regulation was losing ground. Out-of-town motorists were being apprehended, paying their fines and complaining about the lack of uniform regulations. The school children were beginning to build up an air of defiant confidence in the school stop signs. In many cases it was common to observe the school children walking into the street unmindful of the possible disobedience of the school sign on the part of the motorist.

Recommended Practice

During the war period a revised edition of the Manual on Uniform Traffic Control Devices was in process. The new manual has been improved in many phases of traffic control and now specifies that warning or caution signs be diamond shape and suggested messages are offered as a guide for their use. Only the word "SCHOOL" has been suggested at school crosing areas. The manual more specifically sets out the use of school signs as follows: "In some locations where the hazard is particularly great it may be desirable to use a portable sign set up in, or immediately adjacent to, the roadway. *Such a sign shall be displayed only during the hazardous hours and shall be removed at all times when the presence of pupils does not require its use.*"

Realizing the benefits to be derived from accepted standard traffic control practices, our traffic engineering department recommended early use of school traffic signs as set forth above, inasmuch as former school crossing stop signs had become so fragile that immediate replacement seemed advisable. The recommendation was approved and the new "SCHOOL" signs were placed in operation at the more critical school locations throughout the city.

Past records of several years indicate that the city had NOT been charged with a school child-auto accident at a school protected by the guidance of a school patrol boy or girl. The probability of a school child accident at a school crossing has not been enhanced by present regulations and the summary of "Speed Observance" study accompanied herewith will be found to indicate that motorist observance at school signs is remarkably well supported.

Before exploring the summary of the study mentioned, it is well that cognizance be taken of some important factors involved in a regulation of this character upon its installation. Keep in mind "SCHOOL" signs are but a part of the over-all program and the children, parents, school and police authorities must round out the balance of the job.

To the children it is essential that they comply with the safety lessons taught them. They should cross the street at a walking pace, briskly and free of horseplay while in the street. Patrol boys and girls should be thoroughly disciplined as to the importance of his or her assignment. It should not be necessary to remind the parents that most children reflect the parental guidance received at home.

School authorities should follow through and see that students and patrol members are adhering to the safety lessons and regulations taught them and report cases needing enforcement attention to those officers of the police department responsible for school patrol direction and instruction. The police can very effectively foster the importance of complying with traffic regulations from the standpoint of the students, school patrols, parents, school officials and the motorist through regular visitations at locations where school signs have been installed.

Study Summarized

This study is summarized as follows:

1. The importance of adhering to pedestrian safety practices is a continual process.
2. Continued parental guidance and support of traffic measures is essential.
3. Regular police enforcement observations of school traffic safety lessons is always necessary.
4. Keep up the interest on the part of school patrols, their duties of operation and importance of the task they have been assigned.
5. Present portable "SCHOOL" signs have been found to be more effective than those installed upon a permanent basis. Misuse of this type of sign is strongly discouraged.
6. A step in the direction of uniform method of school crossing regulation has been gained.
7. At a recent national assembly of traffic engineers and other traffic safety officials, the subject of "SCHOOL" signs was discussed and those persons present indicated a preference for the portable "SCHOOL" sign rather than the use of school signs of a positive stop character.
8. Speeds observed are within car control limits; two-thirds of all cars come to a stop or to speeds of less than 5 m.p.h. Ninety-two per cent of the total number of motorists were observed to be driving less than 15 m.p.h. Less than 1 per cent were observed to be driving in excess of 25 m.p.h.
9. More frequent gaps in traffic are available than where all traffic is required to stop.
10. Since this study was conducted orders were recently issued to the sign shop personnel to install a speed regulation of 10 m.p.h. on all portable school signs. Unfortunately, two school children were injured at school crosswalk locations after the speed limit was put into effect.

Vehicle Speed Observance at Portable "SCHOOL" Signs
(Percentage Basis)
12 School Crossing Locations

	Stopped	Almost Stopped	0-5 M.P.H.	5-15 M.P.H.	15-25 M.P.H.
Morning	14.0	21.2	31.1	27.0	6.7
Afternoon	21.3	17.4	24.1	26.5	10.7
Both	17.7	19.2	27.5	26.7	8.9

An Investigation of Lane Markings On a One-Way Street

By JOHN L. CHAFFEE

Traffic Engineering Dept., Washington Dept. of Highways, Olympia, Wash.

THE irregularities in alignment of vehicular traffic are one cause of traffic congestion and accidents. Upon consideration of how motor vehicles move on a roadway, there are the two extremes—either having the vehicles move on fixed tracks, or permitting the vehicles to wander anywhere on the roadway. With the fixed condition a larger number of vehicles can be accommodated for a given roadway width. In the case of the unrestricted roadway, there is a wastage of road space because of the tendency to weave, although weaving is essential to free-wheel movement. It is generally believed that lane markings encourage an orderly procession of vehicles, but little factual information as to the effectiveness of lane markings is available. Since much time and money is being spent in placing lane markings on streets and highways, there is a need for study of this subject.

A student research project was undertaken for the purpose of finding whether or not lane markings assist in the proper organization of vehicle traffic on a one-way street. The method used involved two distinct studies: (1) an investigation of traffic characteristics "before" any lane markings, and (2) an investigation of traffic characteristics "after" lane markings were painted on the pavement.

Selection of Site

The location selected for this investigation was on Crown Street, between Temple and College Streets in downtown New Haven, Connecticut. Painted lane lines were the only device used for laning in this experiment. No special signing or enforcement were employed. This problem was further limited to a daytime study and dry pavement conditions. All field data were collected on Tuesdays and Fridays during October and November in 1948.

There were several reasons for choosing the Crown Street location: The street is 27 feet wide, allowing two travel lanes and one parking lane along the right curb; it has been one-way for two years; it had no markings or street car tracks before this study was undertaken, but it was scheduled to be laned by paint striping; lastly, it had a sufficient volume of traffic to be representative of a typical urban, one-way street. A 44-foot zone for study was chosen near the middle of the block so that the effect of lane markings could be probed for moving traffic with a minimum influence from the delays at the adjacent intersections.

For the "after" study the paint stripe between travel lanes was 12 feet long followed by a 6-foot gap. This alternate pattern extended between intersections for several blocks along Crown Street. The parking lane line was a solid line. All lines were 4 inches wide.

Field Procedure

Volume, speed, placement, and headway were the four basic traffic characteristics chosen for study. It was believed that some or all of these characteristics would help to evaluate lane markings. An Esterline-Angus twenty-pen recorder, operated by two six-volt storage batteries, was used to gather the field data. Telegraph keys pressed manually at instant to be recorded gave an impulse to solenoids, which in turn caused a pen to be moved a short distance transversely on a moving chart.

It was the intent of this investigation to have but one physical variation: the previously unmarked street ("before" study) was to have painted lane lines along that same street ("after" study). The street was divided transversely into two nominal lanes of travel and a parking lane. The right lane adjacent to the parking lane was designated as Lane 1, followed by Lane 2 which extended to the left curb. A reference line was established 9.5 feet from the south curb; this reference line was a hypothetical line in the "before" study and the actual paint stripe in the "after" study.

Two observers obtained the field data. One observer was at Station "A" and the other at Station "B", the direction of vehicular flow being from Station "A" to Station "B". Since the instrument used is an efficient way of accumulating data quickly, a 100 per cent coverage of vehicles was attainable during the period observations were made.

Analysis

The information which had been taken in the field on the Esterline-Angus strip charts was first transferred onto office data sheets. Time readings from the strip charts were made to the closest 0.1 second. The entries on the office data sheets were coded for electric punch card work. Punch cards were punched and verified, and tabulations made therefrom in accordance with standard procedures.

Volume

During the time that the field investigation of lane markings was undertaken a total of 5,669 vehicles passed through the study zone. Table No. 1 shows by type of vehicle what part of this total passed before lane markings and what part passed after lane markings.

TABLE NO. I
COMPOSITION OF VOLUME

"Before"	No. of Vehicles	Percent
Passenger Cars	2,214	92.0
Trucks	71	3.0
Busses	121	5.0
Unknown	2	—
Total	2,408	100.0
"After"	**No. of Vehicles**	**Percent**
Passenger Cars	2,986	91.6
Trucks	104	3.2
Busses	170	5.2
Unknown	1	—
Total	3,261	100.0

The composition of the traffic varied but little, as shown in Table No. I, for the percentage of passenger cars, trucks, and buses was only slightly different between the two studies. In view of the fact that over 90 per cent of the vehicles were passenger cars, the number of trucks and buses was not enough to yield stable results. Therefore, the analytical discussion which follows deals principally with passenger cars.

Since all observations were made between 2:45 P.M. and 5:55 P.M. in downtown New Haven, it might be expected that the vehicular flow rate would show a marked increase during the late afternoon peak-hour. This, however, was not the case. Hourly flow rates on the basis of 5, 10 and 15 minute intervals were studied and graphs drawn. Even on the basis of 5 minute fluctuations, there was a consistency throughout the afternoon for both "before" and "after" rates of flow. The fluctuations for these short time periods did give a sawtooth type of curve but the range was quite well defined. On a 5 minute basis in the "before" study the flow rate for the two travel lanes ranged from 515 veh./hr. to 850 veh./hr. with an average rate of flow of 615 veh./hr. On the same basis in the "after" study the range was from 530 veh./hr. to 790 veh./hr. with an average rate of flow of 645 veh./hr. The average rates of flow for the two studies varied by less than 5 per cent.

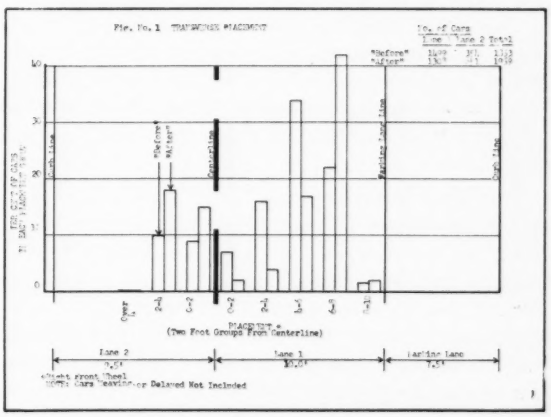
Transverse Placement

The transverse placement of the right front wheel of passenger cars at the study zone is shown by two-foot intervals in Fig. 1. Cars weaving or delayed were not included in this placement graph; however, a separate investigation was made deleting only the weaving cars.

Those cars whose right front wheel fell in the 0-2 foot group to the right of the centerline were straddling the travel lanes. In the "before" study 140 cars, or 6.5 per cent of the total, were straddling the two travel lanes; in the "after" study 48 cars, or 1.5 per cent of the total, were straddling the centerline. In short, straddling of the travel lanes was reduced to a minimum after the lane lines were placed on the pavement.

A glance at Fig. 1 reveals that in Lane 1 the cars moved nearer to the curb parking lane in the "after" study. In the "before" study the modal placement value was in the 4-6 foot group, but in the "after" study the modal value shifted very decisively to the 6-8 foot group. The "before" bar in the 4-6 foot group exceeds the "after" bar by nearly 20 per cent; whereas the "after" bar in 6-8 foot group exceeds the "before" bar by 20 per cent. An average value of right front wheel placement, as found by taking moments about the centerline, was 5 feet in the case of the "before" study and 6 feet in the "after" study. There was very little usage of the 8-10 foot group in either study, which is attributable to the fact that this 8-10 foot group was directly adjacent to the parking lane. Moving cars chose to avoid the marginal friction with cars parked at the curb.

Though there was an increased usage of Lane 2 in the "after" study, there was no appreciable difference in the placement of vehicles in this lane because of the physical limitations involved. The right front wheel placement of cars was restricted by the proximity of the left wheels to the curb barrier. In Lane 2 the average distance from the centerline was 2 feet in the case of both studies.

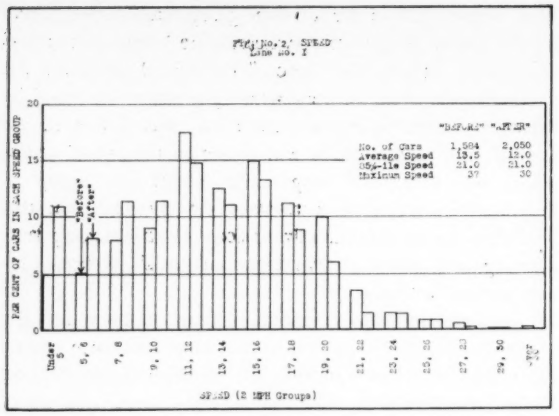


In an analysis of all cars, except those weaving, the results were much the same as those shown in Fig. 1. However, in the analysis with the delayed vehicles considered in the "after" study, there was somewhat less usage of Lane 2 and a greater percentage of placements in the 6-8 foot group in Lane 1. This shift to Lane 1 is explicable by the fact that the preponderant cause of delay in both studies, and notably in the "after" study, was due to cars parking on the wrong side of the street, which prevented other cars from using Lane 2. Some 116 cars out of 2,214 cars in the "before" study were affected by cars parked on the wrong side of the street (where curb parking is prohibited); some 614 cars out of 2,986 cars in the "after" study were affected for the same reason.

Speed

The graph showing speed, Fig. 2, is for all the passenger cars which passed through the study zone in Lane 1 during the period of observation. An analysis was made of the "pure" cars, omitting weaving, straddling, and delayed cars, but the distributions were nearly the same except, as will be noted, for the "Under 5 MPH" speed group.

From Fig. 2 it may be noted that in Lane 1 there was a general skew to the lower speed group after the lane lines were painted on the pavement. The "after" bars exceed the "before" bars up to the 9-10 MPH group. At all higher speed groups the "before" bars exceed the "after"



bars. The speed distribution gave a flatter curve in the "after" study with a notable increase in the number of vehicles in the "Under 5 MPH" group.

The average speed in Lane 1 changed from 13.5 MPH in the "before" study to 12.0 MPH in the "after" study. The 85 percentile in Lane 1 was 21 MPH in both studies. The maximum speed in Lane 1 "before" lane lines was 37 MPH; the maximum speed in "after" lane lines was 30 MPH.

The lower speed for Lane 1 cars in the "after" study may be interpreted in light of the fact that cars moved further to the right in Lane 1, which resulted in more marginal friction between moving cars and parked cars. The fact that the distribution gave a flatter curve may be interpreted to mean that, since the placement shows a better centering of vehicles in Lane 1, a better organization of the cars has been achieved on the street, making possible a freer choice of speed. However, these speeds are at a lower speed level due to the increased marginal friction. The fact that there was a notable increase of cars travelling under 5 MPH in the "after" study is attributable to the higher percentage of delayed vehicles, which for the most part fell in this speed group.

In regard to the speed of cars in Lane 2, flattening of the speed distribution was found after lane markings were painted. A higher percentage of cars was in the lower speed (up to 7 and 8 MPH) and in the higher speed (over 17 and 18 MPH) groups. In Lane 2 the average speed increased from 13.0 MPH in the "before" study to 13.5 MPH in the "after" study. The 85 percentile in Lane 2 was 20 MPH in both studies. The maximum speed changed from 43 MPH to 32 MPH from the "before" to "after" investigation.

Although Lane 2 had a 13.3 per cent increased usage in the "after" study, nevertheless, a slightly increased speed was evidenced. It is possible that this increase was permitted as the vehicles in Lane 1 moved more to the center of their lane and so reduced the medial friction between vehicles in the two travel lanes. The placement shift of vehicles in Lane 1 made possible a freer choice of speed and so a flattening of the speed curve for Lane 2 cars.

A combination of all cars in Lane 1 and Lane 2 revealed that the speed distribution was very much the same as for Lane 1 taken separately. This is explicable by the fact that Lane 1 volume comprised a decisively larger part of the total volume.

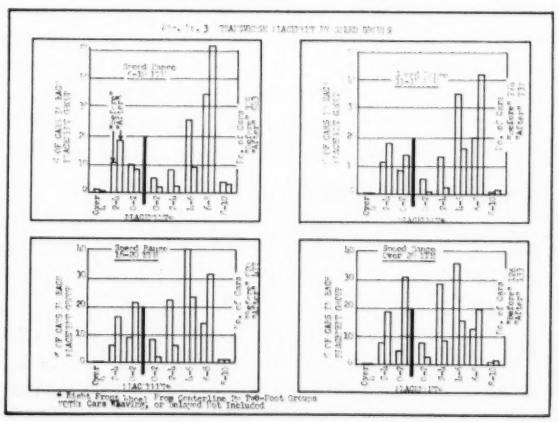
The analysis of only "pure" cars, omitting straddling, weaving, and delayed cars, gave a speed curve nearly identical to Fig. 2. However, instead of having an average speed of 13.5 MPH ("before") and 12.5 MPH ("after") as was found for all cars, the average speed was 14.0 MPH ("before") and 13.0 MPH ("after"). This is accounted for by the fact that the "Under 5 MPH" group had considerable influence when all cars were included, but the same speed group was negligible for the "pure" cars.

In all the speed distributions there was somewhat of a dip for the 13 and 14 MPH speed group. It is possible that this bimodal effect was the result of two types of road users passing through the study zone: one type made up of drivers who were looking for a parking place or cruising around the block, and the other type made up of drivers whose chief concern was to pass through the business district as quickly as possible.

Correlations of Speed and Transverse Placement

An investigation was made of the average speed in each placement group before and after lane lines. The lane markings caused no perceptible change in the average speed of cars traveling in the various placement groups. In both studies the higher speeds were observed for the cars nearest the center of the traveled portion of the street.

In another investigation certain speed ranges were selected to observe the effect of lane markings on placement for various speed groups. As shown in Fig. 3 four speed ranges were chosen: 6—10 MPH, 11—15 MPH, 16—20 MPH, and over 20 MPH. A definite trend developed between the low and high speed ranges.



In the 6—10 MPH range the cars were quite well centered in their lanes. This was particularly the case in the "after" study when over one-half of the cars had their right front wheel placement in the 6-8 foot group. In addition, the placements in the 2-4 foot group of Lane 2 in the "after" study were a rather predominant percentage of the total in this low speed range, a percentage which changed little for the various speed ranges. The total Lane 2 usage is only slightly greater with lane markings. As was found for all speed ranges, there were more

cars straddling the travel lanes when there were no markings on the street.

In the 11-15 MPH speed range the usage of Lane 2 increased over the lower speed range. The number of placements in Lane 2 was nearly equally divided between the 0-2 foot and 2-4 foot groups, the latter group being slightly greater. A shift of placements in Lane 1 toward the centerline was beginning to be evidenced in this speed group; however, the placements "after" lane lines were markedly further to the right than the "before" placements. Some 43 per cent of all placements on the street were in the 6-8 foot group in the "after" study, with but 21 per cent of the total in the same group in the "before" study.

Lane 2 reached a higher level of usage in the "after" study in the 16-20 MPH speed range. In the "before" study a trend toward lesser usage of Lane 2 continued. The 0-2 foot placement in Lane 2 now was the most prominent group in that lane. Similarly, placements in Lane 1 began to bear out the trend of vehicles becoming more centered in the middle of the street with higher speeds. The 6-8 foot group was still the predominant one on the street in the "after" study with the 4-6 foot group the most frequent group in the "before" study.

In the final speed range of cars traveling over 20 MPH the number of cars using Lane 2 with lane markings became equal with the number of cars using Lane 1. This was true in spite of the fact that "before" lane lines there was but a 13 per cent usage of Lane 2 for cars traveling in this highest speed range. In the "after" study the highest percentage placement group now became the 0-2 foot group of Lane 2; next in importance was the 6-8 foot group of Lane1. The greatest tendency for cars to become centered in the traveled portion of the street appeared in this "over 20 MPH" speed range. However, the Lane 1 placements with lane lines were further to the right than those without lane lines.

From the data which comprised Fig. 3 a study was made of the average distance of placements from the centerline for the various speed-ranges in Lane 1. These results (Fig. 4) show that there was a consistent shift of the right front wheel placements towards the center of the traveled roadway as speeds increased. In all speed ranges the lane markings kept cars about 1 foot further to the right in Lane 1 than they were without lane markings.

Because of the proximity of the left wheels to the curb, vehicles having right front placements in Lane 2

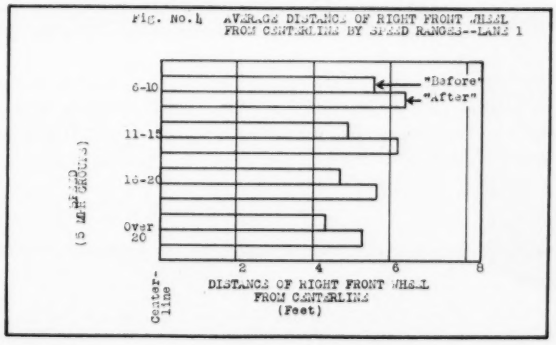


Fig. No. 4 AVERAGE DISTANCE OF RIGHT FRONT WHEEL FROM CENTERLINE BY SPEED RANGES--LANE 1

shifted but little for the various speed ranges. In summary of all speed range results:

(1) Without lane markings more straddling of travel lanes existed, regardless of the speed range.

(2) Cars centered more and more in the middle of the travel portion of the street as the speed increased. As shown in Fig. 4 this tendency to center was nearly a straight line relationship for both studies in Lane 1 with the lane lines holding the cars an average of 1 foot further to the right.

(3) Without lane markings the number of cars using Lane 2 decreased for each successive higher speed range. With lane markings the number of cars using Lane 2 increased for each successive higher speed range until in the "Over 20 MPH" range the number of cars using Lane 2 equalled those using Lane 1.

Special Analysis of Volume Groups

With volume ranges on a 5 minute basis from 515 to 850 veh./hr. before lane markings and from 530 to 790 veh./hr. after lane markings, the selection of different volume groups was confined to a rather narrow range without extreme rates of flow available for study. Final choice was on the basis of two groups: one under 575 veh./hr. and the other over 700 veh./hr. This choice gave the maximum difference of rates of flow which would yield fair samples from the "before" and "after" studies.

Table No. II is presented to show the makeup of the two selected rate of flow groups.

TABLE NO. II
RATE OF FLOW GROUPS

	"Before"	"After"
Under 575 veh./hr.		
No. of 5 min. periods represented	19	12
Total vehicles represented	865	556
Average rate of flow (veh./hr.)	547	555
Over 700 veh./hr.		
No. of 5 min. periods represented	7	13
Total vehicles represented	453	806
Average rate of flow (veh./hr.)	776	744

From this table it may be noted that the average rates of flow for the two chosen groups varied from each other by approximately 200 veh./hr., or 35 per cent.

Though rate of flow is made up of all vehicles which pass a given point during a given time period, the following analytical discussion deals only with the passenger cars in the two selected groups. Furthermore, only the "pure" car sample is included; the purpose of this is to eliminate the variables caused by straddling, weaving, or delayed cars and allow as true an analysis as possible of lane markings for different volume groups.

Volume vs. Transverse Placement

In the "under 575 veh./hr." group there was twice as much usage of Lane 2 when lane markings were on the pavement. Cars in Lane 1 tended to move to the right in the "after" study with the 6-8 group replacing the 4-6 group as the modal value. In Lane 1 the average distance of the right front wheel from the centerline was 5 feet in the "before" study and 6 feet in the "after" study.

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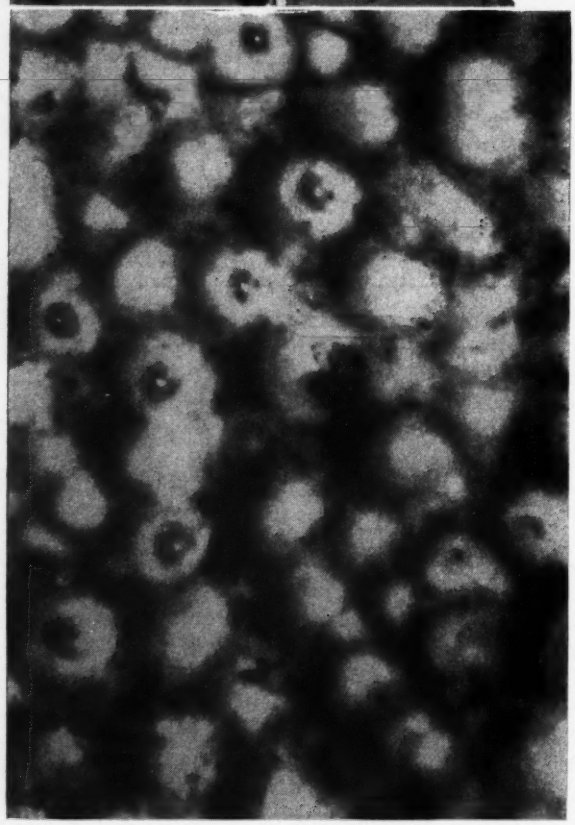

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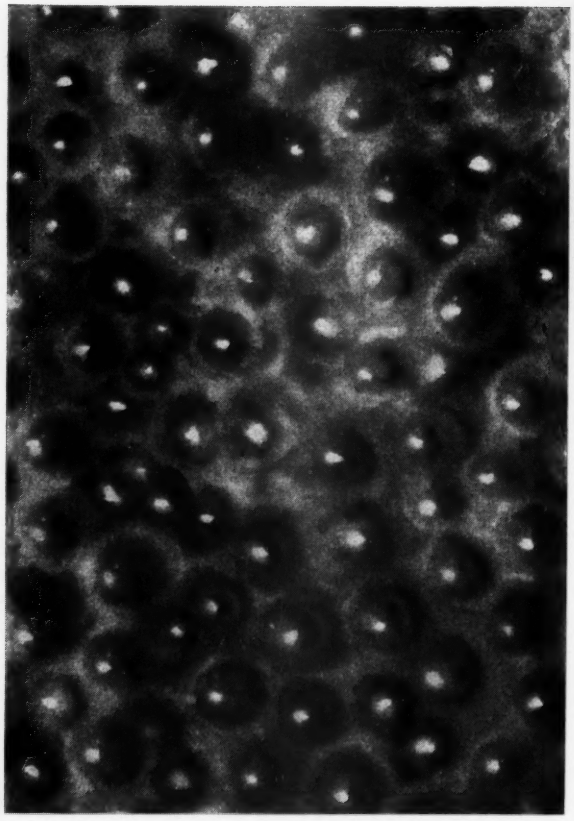

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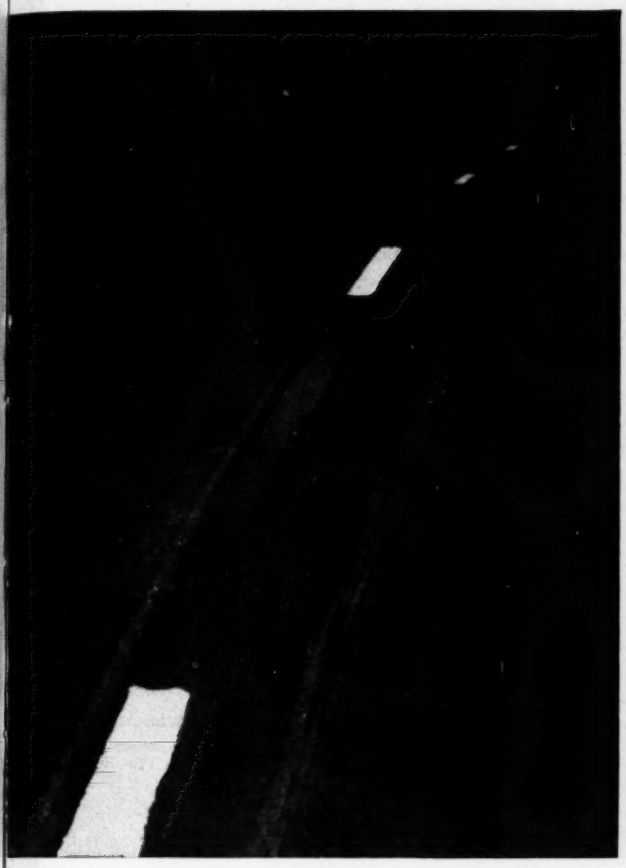

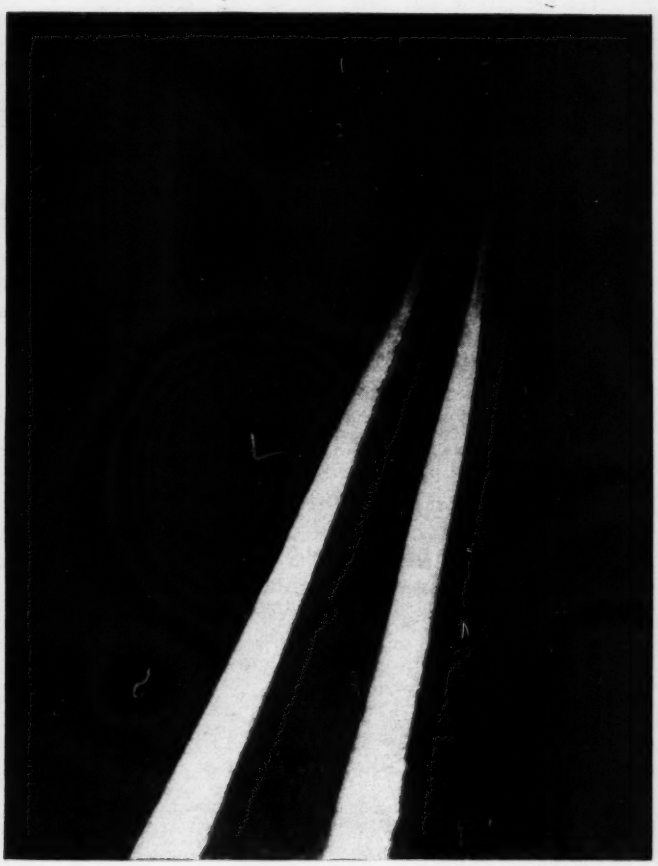

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For the cars in the "over 700 veh./hr." group there was a small increase in usage of Lane 2 after the lane markings. The Lane 1 placement distribution moved further to the right with lane lines. In the "before" study the average distance of the right front wheel from the centerline was 5.5 feet; in the "after" study it was 6.5 feet.

Though in both volume groups cars were better centered in the lanes after lane markings, the most notable change of placements was for the under 575 veh./hr. volume group. There was a higher usage of Lane 2 "after" lane lines, with the predominant increase in the 575 veh./hr. group in which the usage doubled. In both volume groups the markings tended to move cars in Lane 1 to the right 1 foot, the over 700 veh./hr. group having placements somewhat further to the right than the under 575 veh./hr. group. There was almost no usage of the 8-10 foot group of Lane 1 in either volume group for either the "before" or "after" studies. Since the parking lane adjoined this placement group, moving cars chose to avoid the marginal friction with cars parked at the curb.

These placement results show to a limited extent that lane markings accomplish the most toward proper vehicle organization for the lower rates of flow. At the higher rates of flow centering in the lanes is more self enforcing.

Volume vs. Speed

In the under 575 veh./hr. group "after" lane lines the speed distribution had nearly equal spread from 5-20 MPH; whereas, "before" lane markings most of the cars had speeds from about 11-18 MPH. The average speed fell from 15.0 MPH before lane markings to 13.0 MPH after lane markings.

In the over 700 veh./hr. group the speed distribution experienced a flattening out with lane markings on the pavement. Even so, the speed distribution had a more sharp modal shape after lane markings for the over 700 veh./hr. group than for the under 575 veh./hr. group. The average speed changed from 13.5 MPH in the "before" study to 13.0 MPH in the "after" study. Unlike the 575 veh./hr. group, as between "before" and "after" studies, the 700 veh./hr. group had a nearly equal redistribution of speed to the higher and lower speeds. Without lane lines the two volume groups had average speeds which differed by 1.5 MPH; with lane lines the two volume groups had the same average speed.

The marked tendency of the speed distribution to reach a nearly constant level in the under 575 veh./hr. group with lane lines indicates that a freer choice of speed was made available as cars became better centered in their lanes. The under 575 veh./hr. volume group attained a flatter distribution than the over 700 veh./hr. group because, in addition to the better placement, fewer cars were influencing each other and even wider choices of speed were permitted.

Conclusions

(1) A study of the transverse placement of vehicles on the roadway affords a positive analysis of vehicle organization. The presence of lane markings on the pavement materially assisted in centering cars in the travel lanes. The better centering of vehicles in the right lane permitted greater usage of the left lane.

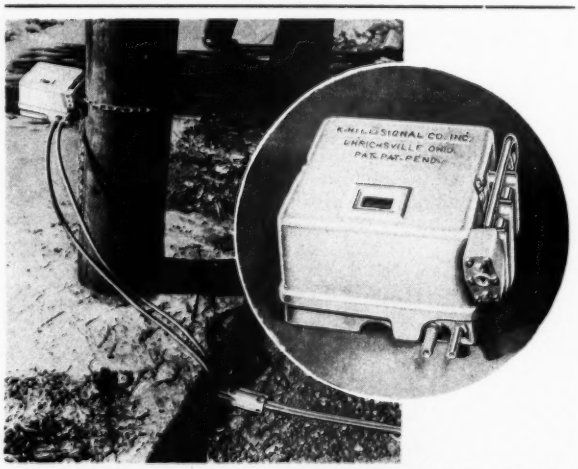
(2) Cars traveling in the right lane moved nearer to the cars parked at the curb and chose to slow down with the increased marginal friction. This resulted in less medial friction between the two travel lanes, and the cars in the left lane chose to move at slightly higher speeds.

(3) The correlation of placement and speed ranges was probably the most important single analysis of this investigation. The lane lines do the most good for the higher speed ranges—derived from the fact that usage of the left lane was less for higher speed ranges "before" lane lines and increased until both lanes had equal usage "after" lane lines.

(4) The correlation of volume and placement indicates that lane markings do the most good for the lower rates of flow. This analysis would have been even more significant had there been a selection of volume groups having wider ranges. It is believed that the rates of flow which were observed in the study zone were medium values and not as large volumes as the street would accommodate had there been sufficient demand.

(5) The elimination of cars weaving, straddling or affected by double parking, wrong side parking, or intersection delay was probably an unnecessary refinement, for in most every instance the analysis of all cars as a group gave the same results.

This is the third in a series of articles based on student research for thesis requirements. Mr. Chaffee was a member of the 1948-49 class of the Yale Bureau of Highway Traffic.



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2. Use TWO road tubes side by side to count ONE DIRECTION only.
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BOTH road tubes cross ALL traffic lanes.
Safer to Install.
Traffic flows normally.

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Traffic-Actuated Signals Had Premier In Baltimore

By CHARLES ADLER JR. (Affil., ITE)

Consulting Signal Engineer, Baltimore & Ohio Railroad, Baltimore, Md.

THE first traffic-actuated traffic signal ever to be placed in public use, was designed by the writer and installed at Falls Road and Belvedere Avenue in Baltimore on February 21, 1928. Early the following morning, Washington's Birthday, the late Inspector George E. Lurz of the Baltimore Police Department, turned on the current, and the device was in operation.

The signal constantly showed the green light to Falls Road, the main artery, and red to Belvedere Avenue, the cross highway, reversing these indications only when motorists approached on Belvedere Avenue and sounded their auto-horns. The green remained on Belvedere Avenue for a period of time sufficient to let the cars pass the crossing, and then automatically reverted to its normal position to give the right-of-way to Falls Road. Thus, the signal changed only in accordance with traffic demands. Traffic was never halted unnecessarily.

Principles Still Hold

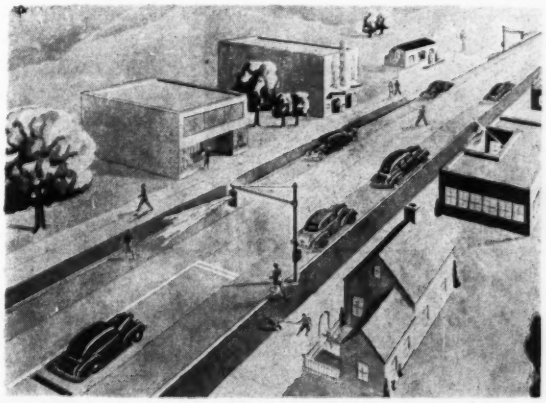
But while the use of the horn operated signal was limited to isolated intersections out in the open, where the noise of the motorists' horns would not disturb nearby residents, the apparatus proved the practicability and utility of traffic-actuated control. The principles demonstrated in the Falls Road installation over twenty-one years ago are still underlying in the present-day traffic-actuated systems.

The auto-horn method of control was soon superseded by the vehicle-detector system called "Electromatic," which was designed by Harry A. Haugh of Yale University. The first installation of this arrangement was made at Orange and Humphrey Streets in New Haven, Connecticut, on April 10, 1928. Traffic-actuation was accomplished by the passage of automobiles over electric units imbedded in the right-hand portion of the street at the approaches to the signalized intersection, and this method is used in signals of today.

Each Car Accounted For

The function of the electric vehicle detector unit, is to note the passage of each car and to convey this information in the form of electrical impulses to the control mechanism housed in a cabinet at the base of the signal pole. In the absence of traffic, the colored light indications remain stationary; but when cars approach, the lights change in exact accordance with the number of vehicles on each intersecting street. No car is ever delayed an instant longer than is necessary to allow conflicting cars to pass safely. Regardless of number, each automobile is accounted for by the detectors, and the mechanism regulates the signal accordingly.

From the simple isolated crossing to complex multiple street intersections, the control by traffic-actuation has demonstrated its ability to move large or small numbers of vehicles safely, and without unnecessary delay. Even the pedestrian is safeguarded. By means of push-buttons conveniently placed at the intersection when required, the signal can be changed for a period of time sufficient for a person to cross the street.



Modern traffic-actuated speed control here used at approaches to town. They are used extensively throughout the country and are described in the Manual on Uniform Traffic Control Devices.

At intersections as well as at non-intersectional points of danger such as curves, approaches to towns, school zones, and the like, where speed creates a hazard, speed control traffic-actuated systems, originated by the writer, are in successful operation at many such locations throughout the country.

Maryland, Delaware Point Way

The State Highway Department of Delaware and the State Roads Commission of Maryland were among the first to standardize traffic-actuated signals. Other State highway departments soon followed their example, and today this form of traffic control predominates on the open road.

But while the states have adopted traffic-actuation, many important cities still continue to install fixed-time lights at isolated crossings and progressive fixed-

(See SIGNAL PREMIER, *page 144)*

Modern Snow Removal Programs Increase Tax Revenue - Save Money

Many state and municipal administrations faced with rising costs and shrinking budgets overlook an important method of simultaneously increasing tax revenue and reducing street and highway department costs when they maintain antiquated snow removal programs that reduce automobile travel during the winter months. A study of gasoline consumption in 17 northern states indicates an enormous loss of tax money during the winter because travel is drastically curtailed then. While some reduction is inevitable, because of the fact that many people take vacations during the summer, and in general do more driving at that time, the study indicates that a great deal of *essential* travel is also eliminated from December through March because roads and streets are covered with snow annd ice.

Figures taken from Public Roads Administration reports show that in the 17 states that were studied gasoline consumption by automobiles and trucks dropped from 2,436,579,000 gallons in July and August to 1,734,468,000 gallons in January and February. Taking 3 cents a gallon as an average tax on gasoline—many states tax more than 3 cents, of course—this means that gasoline tax revenue plunged from $73,097,370 to $52,034,040 during those months in these 17 states alone—a difference of $21,063,330 in potential income.

While it would be difficult, if not impossible, ever to bring total winter driving up to total summer driving, the difference in gasoline consumption and revenue is sufficiently wide to indicate that a great deal might be done in this direction by making winter travel easier and safer by means of modern, efficient snow and ice removal programs.

In addition to increasing tax revenue, such programs, when they utilize rock salt for fast and complete snow and ice removal, enable communities to save as much as 30 per cent of the money formerly spent on this work. Royal W. Thompson, Superintendent of Streets in Hartford, Connecticut, reported such a saving when he began to spread rock salt on Hartford's streets, and commissioners in cities like Detroit, Michigan; Portland, Maine; Malone, New York; Passaic, New Jersey; and many others report similar substantial economies.

Discussing the reasons for such savings, Edward F. Morgan Jr., Superintendent of Streets in Hudson, Massachusetts, explained them in this way. "Rock salt is less expensive to use than sand, fewer men are needed to apply it, and generally, one application is enough. Added to this, it doesn't have to be dug out of the sewers in the spring."

LINE PRODUCTION MEANS UNIFORMITY

Exclusive use of Miro-Flex traffic control signs and street-name assemblies in many of the nation's largest cities and progressive small towns is *proof of the pudding!* Governing bodies like them . . . citizens like them! Made of zinc-coated bonderized steel, embossed, baked-enamel finish. Available standard or special. Write for catalog.

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Reference Notes

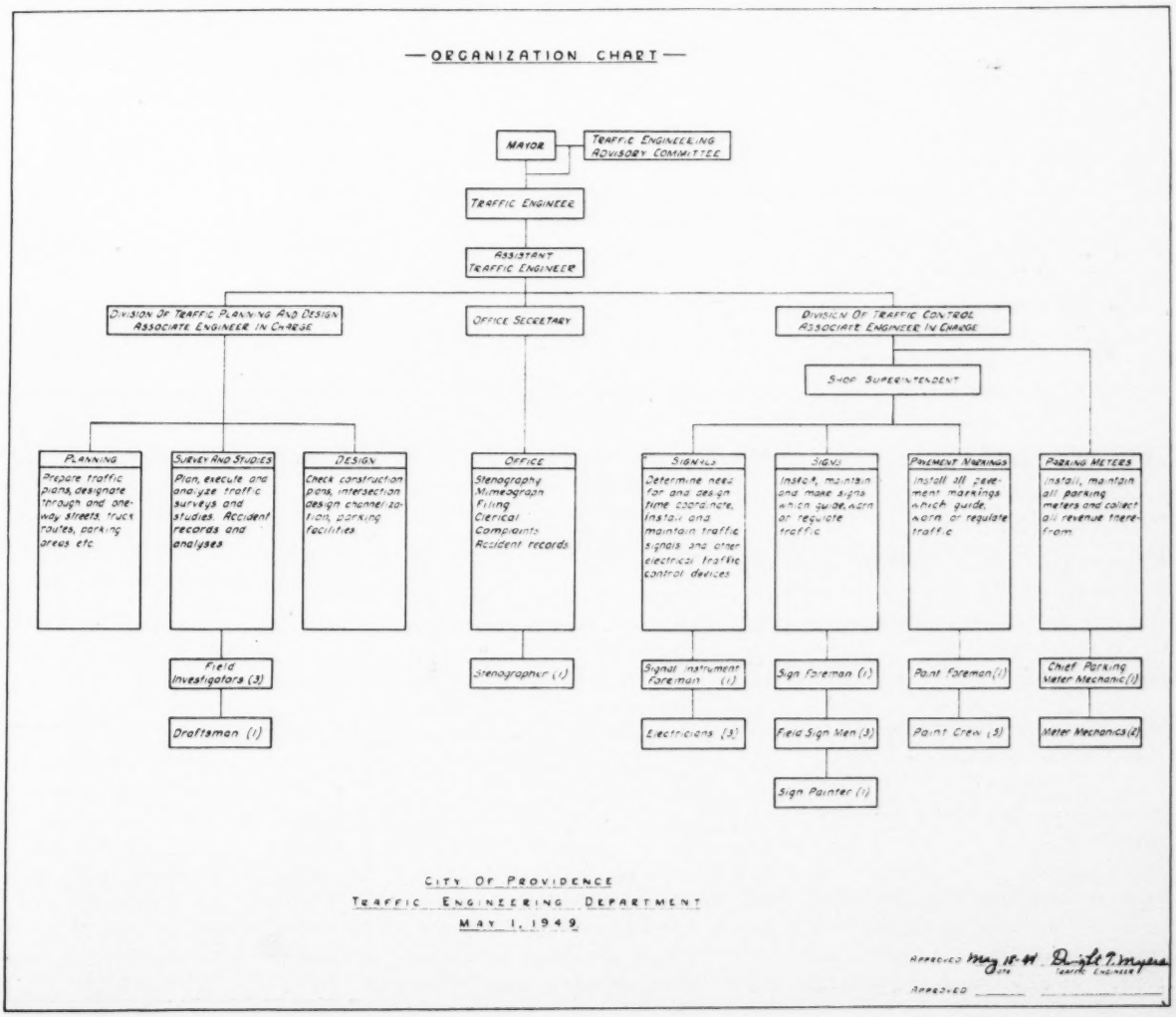
By Dwight T. Myers
Traffic Engineer
City of Providence, R. I.

The organization chart of the newly-established Traffic Engineering Department in Providence, R. I., is considered a model for all cities over 100,000 population. Mr. Dwight T. Myers is the City's Traffic Engineer. His department is, in effect, divided into two sections under the direction of his assistant, Mr. Roger T. Chandler. The Division of Traffic Planning and Design is directed by Associate Engineer Benedict Barkan. This section is responsible for all traffic surveys and traffic planning. The other section is known as the division of Traffic Control. The department has been unable to find a man to fill this post. This division is responsible for the installation and maintenance of all signals, signs, pavement markers and parking meters.

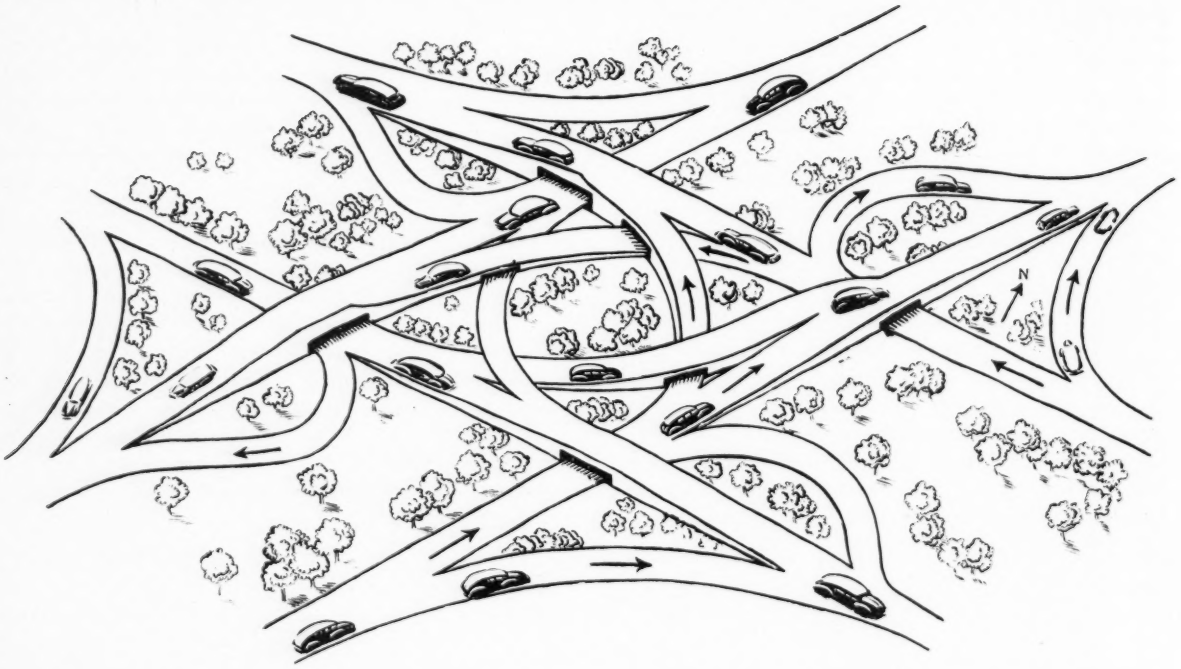
To date, the department has a total personnel of 27 people and an annual budget of approximately $200,000.00. The initial program has been concentration on painting, signing, and the installation of some special traffic signals. Up to the present time, they have applied approximately four times the amount of paint formerly used. They have installed approximately 1,500 new signs and are completing the installation of some special pedestrian signals in the vicinity of the Mall near the Union Station.

At the present time, the Department is working in conjunction with the City Plan Commission and the Redevelopment Agency to develop an Off-Street Parking Plan for the City of Providence. Through legislation passed last year by the Legislature, the City of Providence is now authorized to construct, maintain, and operate lots and garages. They have hopes that, very early in the new year, they can come up with the final plan for the location of proposed off-street garages, together with a plan for financing their operation and construction.

Other activities of the Department have been of the usual variety—that is, particular emphasis on parking restrictions, installations of modern bus stops so that the buses can pull up to the curb to load and unload and not interfere with the efficient movement of traffic in the very narrow streets, many turning prohibitions, and some progress in the study of arterial routes, and the designation of truck ways.


— ORGANIZATION CHART —
MAYOR
TRAFFIC ENGINEERING ADVISORY COMMITTEE
TRAFFIC ENGINEER
ASSISTANT TRAFFIC ENGINEER
DIVISION OF TRAFFIC PLANNING AND DESIGN ASSOCIATE ENGINEER IN CHARGE
OFFICE SECRETARY
DIVISION OF TRAFFIC CONTROL ASSOCIATE ENGINEER IN CHARGE
SHOP SUPERINTENDENT
PLANNING
Prepare traffic plans, designate through and one-way streets, truck routes, parking areas etc.
SURVEY AND STUDIES
Plan, execute and analyze traffic surveys and studies. Accident records and analyses
DESIGN
Check construction plans, intersection design channelization, parking facilities
OFFICE
Stenography
Mimeograph
Filing
Clerical
Complaints
Accident records
SIGNALS
Determine need for and design time coordinate, install and maintain traffic signals and other electrical traffic control devices
SIGNS
Install, maintain and make signs which guide, warn or regulate traffic
PAVEMENT MARKINGS
Install all pavement markings which guide, warn or regulate traffic
PARKING METERS
Install, maintain all parking meters and collect all revenue therefrom
Field Investigators (3)
Draftsman (1)
Stenographer (1)
Signal Instrument Foreman (1)
Electricians (3)
Sign Foreman (1)
Field Sign Men (3)
Sign Painter (1)
Paint Foreman (1)
Paint Crew (3)
Chief Parking Meter Mechanic (1)
Meter Mechanics (2)
CITY OF PROVIDENCE
TRAFFIC ENGINEERING DEPARTMENT
MAY 1, 1949
APPROVED May 18-49 Dwight T. Myers
TRAFFIC ENGINEER
APPROVED

Open Discussion



The above sketch will serve as an introduction to a new highway system plan, which I would appreciate your giving consideration. The sketch shows the diametrically opposed feature and other pertinent factors.

Briefly, all traffic desiring to turn right does so at either of the two points shown and enters the transverse flow at the extreme right or left. All traffic to the left turns left and enters artery to the left. Through passage is unimpeded by this method. With proper markings displayed, this should cause self regulation, to a degree, on the part of the operator. Primarily, safety is first and the cost is secondary.

Your comment will be greatly appreciated.

Charles V. Hammond, Sr.
Box 977
Key West, Florida

U. S. Chamber of Commerce Transportation Committee Holds Initial Meeting

The many problems facing the transportation industry were given attention at an initial meeting of the newly enlarged Transportation and Communication Department Committee of the Chamber of Commerce of the United States, just held in Washington. This committee is broadly representative of the nation's transportation interests.

Opening the meeting, Evans A. Nash, of Oklahoma City, committee chairman, declared the committee's chief objective is to strengthen the present privately owned and operated transportation system. He added:

"We are interested in the recently authorized Congressional studies on transportation and communication. We feel that much can be accomplished through cooperation with the Senate and House committees conducting these inquiries."

Outlining the scope of the Committee interest, he said that part of its current duties were to appraise present Chamber policy on highways and airports.

Highway discussion centered on whether the development of toll roads should be encouraged or discouraged, whether special federal funds should be earmarked for rural road improvement and on the recommendations contained in the recent highway defense report of the Bureau of Public Roads. That report recommends that an additional 11.2 billion dollars be expended on the 38,000 miles of interstate highways and that it would seem appropriate to increase the Federal participation to a ratio greater than the present fifty per cent.

Traffic congestion on downtown city streets has slowed automobile, public transit vehicles, ambulances and even fire engines to an average speed of only three miles an hour according to leading traffic engineers.

TRAFFIC NEWS

Mass Production Line Keeps Army Vehicles Ready

Utilizing mass production methods in the maintenance of motor vehicles, the Yokohama Motor Command, organized April 1, 1948, is an outstanding example of American efficiency and "know-how" at work. The unit operates and maintains 1500 motor vehicles that serve 8th Army Headquarters and the greater Yokohama area.

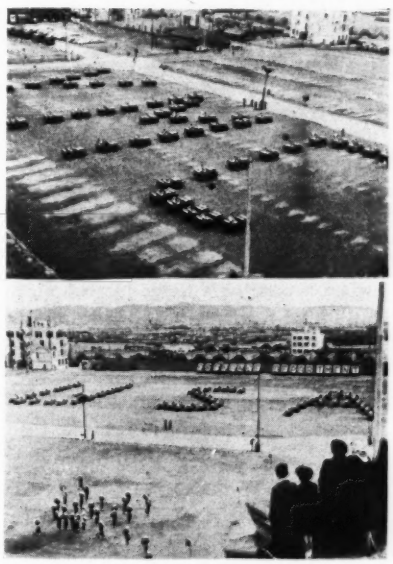
When the command was activated, mechanical inspection revealed that more than 30 per cent of the vehicles were unsafe to operate. At the present time, less than 2 per cent of the machines are inoperative.

The YMC, under the command of Col. Ernest A. Suttles, comprises two battalions and a provisional battalion. A total of 18 companies of 50 to 70 vehicles are operated. Approximately 50 per cent of the drivers are Japanese.

Mass production methods are utilized throughout the YMC. The Operations Division directs and supervises the dispatch, use and safety of every vehicle in the organization.

All phases of maintenance, whether it be a flat tire, worn-out motor, or a vehicle involved in an accident are the responsibility of the Maintenance Division. This division operates a central super-service station that services about 1000 vehicles a day. While a machine is being supplied with gasoline, oil, water and air it is inspected for mechanical deficiencies.

Each vehicle in the YMC takes a monthly trip through the mass production maintenance lines. At each stop on these lines, maintenance work necessary to "keep 'em rolling" is accomplished. This facility, a type new to our Army, consists of four lanes with a capacity of 80 vehicles a day. The maintenance lines are supported by an ordnance Field Maintenance shop and its allied trade shops.



"Jeeps" of the Yokohama Motor Command spell out YMC and USA on a recent demonstration, inspection and review "Field Day".

The Supply, Personnel and Inspection divisions are important sections of the YMC. While maintaining current records which indicate the mechanical condition and appearance of each vehicle, the Inspection Division operates the largest driver testing station in Yokohama.

The Inspection Division also processes every privately owned vehicle that enters or leaves the port of Yokohama.

Two factors that have resulted in the high morale and esprit de corps evident in the YMC are the 56-piece jeep motorized band and clean, hard-fighting athletic teams.

The troops of the YMC utilize to the fullest their ingenuity and aggressiveness in decorating and making homelike their quarters, dayrooms, mess halls and clubs.

In the performance of their duties, they display the alertness, military bearing and courtesy typical of well-disciplined soldiers.

—Army Times

International Road Federation Awards Fellowships

The first two of a series of fellowships in traffic engineering have been awarded by the International Road Federation to Engineers Ricardo Gandolfo from Lima, Peru, and Rafael Cal y Mayor from Mexico. These fellowships are offered by IRF, in cooperation with its affiliated good roads associations in Latin America, as part of its work to help promote sound highway planning.

Ricardo Gandolfo, 24, is a graduate of the National School of Engineering in Lima, Peru, and is employed by the Peruvian Highway Department as highway construction engineer. Recognizing the importance of farm-to-market and feeder roads for a fuller development of his country's natural resources, he looks forward to learning, among other things, how such systems are planned in America.

Rafael Cal y Mayor, 25, is a graduate of the National University of Mexico and is a licensed civil engineer. He is interested in traffic and parking problems and has written a thesis about multi-story parking garages for Mexico City. He has contributed several articles on traffic problems to the Mexican press.

Safe Driving Awards

Governor Dan E. Garvey recently accepted a bronze plaque honoring the state of Arizona for progress in the instruction of safe driving in the state's high schools during the past year. Awarded by the Association of Casualty and Surety Companies, the plaque represents the Superior Award given for maintaining high standards of driver education in more than 50 per cent of the state's high schools with more than 50 per cent of all eligible students enrolled, and was won by Arizona for the second successive year.

The plaque was presented by Perry Taft, manager of the Association's West Coast Office at a brief ceremony in the Governor's offices, who pointed out that Arizona was now offering driver education courses in 69 of its 70 secondary schools, with 5,609 students enrolled in the courses during the school year 1948-49. He gave much credit for the continued success of the program to unremitting efforts of the State Highway Department's Driver Training and Safety Education Division.

As a means of stimulating greater interest in high school driver education courses, the Association of Casualty Companies two years ago offered annual awards to states whose high schools measure up to fixed high standards of driver instruction. The winners are selected each year by a committee of nationally prominent educators and safety specialists.

In addition to Arizona, 16 states are qualifying for driver education awards this year, as compared with only nine qualifying in 1948. Other states receiving the Superior Award are:California, Illinois, Indiana, Massachusetts, New Jersey, North Dakota and Wisconsin; Meritorious Award: Connecticut, Michigan, Minnesota, Oklahoma, South Carolina, Texas, Washington and West Virginia. Special Award—Delaware.

The official reports of 43 states which participated in the award program show that 6,191 high schools in those states offered safe driver training courses during the 1948-49 school year. This was an increase of nearly 44 per cent over the 1947-48 figure of 4,307 high schools. During the same period the number of students enrolled in the courses rose from 333,017 to 481,723, an increase of 45 per cent.

ARBA Membership Structure Revised

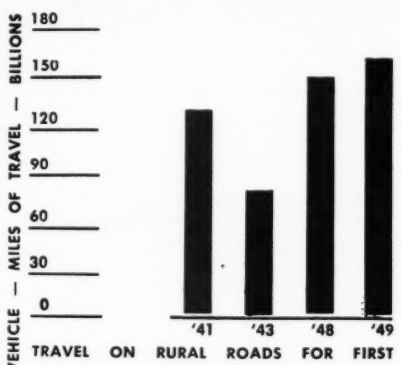
Revision of its membership structure, to return Manufacturer Members to an individual company membership basis, is announced by the American Road Builders' Association.

Action directing this step was taken by the ARBA Executive Committee when it adopted a resolution restoring the original direct relationship which existed between ARBA and its Manufacturer Members prior to the organization of Construction Industries Association, Inc., three years ago. At that time, CIA embraced the ARBA Manufacturers' Division.

Pointing out that return to the direct relationship is undertaken in the interests of strengthening the ARBA membership structure and its position and policies, the Executive Committee asserted:

"This action in no way is to be construed as reflecting on Construction Industries Association, Inc., or any of its activities, but is taken as a means of strengthening the ARBA's position both as to its membership structure and the excellent position it occupies in the public mind. CIA identifies its membership principally with the construction manufacturing industry. From the standpoint of ARBA, it is essential that all its members, representatives of the entire highway industry and profession, be identified directly with ARBA and its technical and scientific program, regardless of what other affiliations individual members may have."

Traffic Trends



TRAVEL ON RURAL ROADS FOR FIRST NINE MONTHS OF 1941, 1943, 1948 AND 1949.

Based on Public Roads Administration Data

Obituary

Word was recently received of the death of Henry M. Brinckerhoff (Mem., ITE), on October 12, 1949. At the time of his passing, Mr. Brinckerhoff had retired from active service with his consulting firm, Parsons, Brinckerhoff, Hall and MacDonald.

He joined the firm in 1906 and was assigned the responsibility of handling the traffic and transportation work for the organization. This activity carried him to a majority of the major cities in the middlewest and on the Atlantic seaboard. His major traffic engineering assignments before retirement included a traffic study for the Pennsylvania Turnpike Commission in 1937-38, and the development of exterior and interior transportation for the New York World's Fair.

Mr. Brinckerhoff became a member of ITE in April 1931 and has provided active support since that time. The entire membership will sincerely regret the passing of one who helped pioneer the organization.

Report of Executive Secretary-Annual Business Meeting

(Continued from November issue)

Training Conferences

The Institute continued its support of state-wide "in-service" traffic engineering training conferences during the past year. Colorado and Washington held conferences for the first time and Missouri presented its second annual conference. The Western Section, ITE actively supported the two conferences in the western states and individual members contributed to the success of the Missouri conference. Again these conferences exceeded all expectations for attendance, interest, and resultant advancement of the traffic engineering profession in the areas covered.

Tentative plans are being formulated for a continuation of this service next year. In order to present a uniform program to all state highway organizations, universities, and others indicating an interest in state-wide conferences, National Headquarters has prepared an Information Bulletin detailing the objectives, organization, subject matter, speakers, and other pertinent data. A copy of this bulletin is available upon request.

Public Relations

Activities of National Headquarters directed toward public relations continue to improve. Due to the rapidly expanding Institute library, and a revised filing system, a sincere effort is being made to answer promptly, authoritatively and accurately the questions which are continually arising in the field of traffic engineering. If answers are not available, inquiries are referred to the correct source of information.

The official list of national and international organizations with whom we have begun active liaison and cooperative effort has now grown to a total of 60, nearly double the number on file a year ago. Among the more important developments along this line during the past year were:

(1) The provision of pertinent publications to the 48 State Registration Boards, through the National Council of State Boards of Engineering Examiners, to effect a better understanding on their part of the purposes and functions of traffic engineering. Additional information was forwarded to a special NCSBEE Sub-Committee on Qualifying Experience whose function was to draft recommendations regarding traffic engineering and other branches of engineering;

(2) The decision of the Board of Direction to officially endorse the inclusion of traffic engineering sessions in the Southern Safety Conference;

(3) Authorization by the Board of Direction of official ITE sponsorship of annual awards to states and cities showing outstanding achievement in Traffic Engineering during the year. The Traffic Engineering Section of the Annual Inventory of Traffic Safety Activities (formerly known as the National Traffic Safety Contest) formed the basis for making the awards. Cities and states eligible for these awards were required to show that traffic engineering responsibility had been definitely assigned by ordinance, resolution or executive order;

(4) Affiliation as a cooperating agency to the State Department, through the office of Transport and Communications, in connection with the world-wide Convention on International Road and Motor Traffic held in Geneva in August. The Institute was officially requested to review the document being prepared by the State Department and other countries for purposes of discussion at the conference;

(5) Affiliation with International Road Federation as technical advisor;

(6) Provision of certain publications and specifications to the U. S. National Committee of the International Commission on Illustration in support of international understanding and standardization of traffic signals; and

(7) Personal contact with Engineers Joint Council and the Engineer's Council for Professional Development on the recent Survey of Selected Engineering Personnel, participation in a cooperative conference of engineering societies, and other matters directly related to the ITE position among the founder engineering societies.

Your National Headquarters continued to furnish reports to contributors on ITE progress and activities. Approximately 700 special card invitations to attend the Annual Meeting were directed to the contributors, 60 national associations, State Highway Commissioners, Mayors and City Managers of all cities 50,000 population and over, and City Engineers in six states adjacent to the District of Columbia in cities 10,000 to 50,000 population. Your Executive Secretary attended meetings of the Florida, New England, New York and Washington sections of the Institute, which afforded an opportunity to personally contact approximately one-third of the ITE membership. The steadily increasing amount of daily correspondence arriving at national headquarters is sufficient evidence to your Executive Secretary that the time and effort involved in this public relations program has proved a valuable asset to the Institute.

Changes in Constitution and By-Laws

Changes in the Institute's Constitution and By-Laws were approved by affirmative vote of two-thirds of all ballots canvassed on December 1, 1948. Briefly, the changes are as follows:

(1) Action to be taken when unscheduled vacancies occur in the Board of Direction (Const., Art. III, Sec. 3).

(2) Provision for election of overage Junior members for an interim period (By-Laws, Art. I, Sec. 5).

(3) Change of communication channel relative to written resignations (By-Laws, Art. III, Sec. 2).

(4) Elimination of membership nominations and continuing nomination of Officers and Directors by Nominating Committee (By-Laws, Art. V).

(5) Change of time period in which Annual Meeting may be held (By-Laws, Art. VI, Sec. 1).

(6) New Article pertaining to government of the affairs of the Institute by the President and Board of Direction (By-Laws, Art. VII).

A number of far-reaching changes having particular reference to geographical representation of Directors of the Institute, adopted by resolution of the Board of Direction, have been submitted for discussion at this meeting.

Committees

The past year was a *reorganization* year for ITE Technical and Cooperative Activities committees. The time and effort spent in re-grouping the former 19 committees into 6 functional committees necessarily curtailed an active "project" year. However, important long-range programs have been developed which will be projected into the coming year. Details of these projects will be reported by committee chairmen at this meeting.

One of the fundamental purposes for reorganization of Technical Committees, is the development of a technical loose-leaf notebook of completed committee projects. This loose leaf notebook would be divided into six major sections under the titles of the present six Technical Committees. As each Committee completed a specific project, the material would be presented through the General Chairman of the Technical Committees to the Board of Direction for final approval and inclusion in the notebook. The material would then be set in mimeograph form and distributed to each member of the Institute to place in the appropriate section of a loose-leaf notebook. In the future, when standards or specifications prepared for the notebook are considered of permanent value they can then follow the practice of adoption as an American Standard and preparation of a Technical Bulletin. In other words, the loose-leaf notebook will form the basis for selection of future permanent technical bulletins. Meanwhile, however, the Institute membership will have the benefit of *tentative* standards and specifications prepared by each of the Technical Committees.

In line with the reorganized committee structure, a Coordinator of Research, Mr. Light B. Yost, was appointed at the beginning of the year. In this capacity, Mr. Yost will be responsible for complete knowledge of research activity of each of the six Technical Committees and coordination of these activities with similar research being conducted by the Highway Research Board, Public Roads Administration, and American Association of State Highway Officials. If any major conflict appears on the horizon it will be the responsibility of Mr. Yost to effect the necessary coordination with the appropriate committee chairman and representatives from the other organizations involved.

The eight Administrative Committees continue to provide capable and efficient support to national headquarters and to the membership. All of these committees form the real backbone of the Institute and contribute substantially to the advancement of the profession.

A report on ITE Committees would not be complete without special recognition of the work of your Annual Meeting Committees, and more particularly the Local Arrangements group, who are largely responsible for the preparation and the many intricate details of planning the present Annual Meeting. I am certain that all of you will be pleased with the results of these efforts by the time of the closing sessions and special features on Wednesday evening.

Local Sections—Student Chapters

The seven Regional and Local Sections of the Institute have experienced an exceptionally active year, and are beginning to play more important roles in national, regional and local circles. All but one of the Sections now have individual letterhead; and one, the Western Section, publishes a periodical bulletin to its widely scattered membership.

All Local Sections, either directly or through individual members, sponsored or participated in the following national and regional conferences: (1) Southern Safety Conference (Florida Section); (2) Michigan Safety Conference (Michigan Section); National Safety Congress, Midwest Safety Conference, and Northwestern Institute for Traffic Training (Midwest Section); Sixth Connecticut Traffic Engineering Conference, and Yale Institute for Traffic Training (New England Section); Greater New York Safety Council Annual Meeting (New York Section); Annual Meeting, ITE (Washington Section); California Institute for Traffic Training, First Washington Traffic Engineering Conference, First Colorado Traffic Engineering Conference, Western Safety Conference and various Road Congresses (Western Section).

The Washington and New York Sections proposed changes in their respective Constitution and By-Laws to provide for Local Section Affiliates, similar to the Florida Sections existing provisions. The Midwest Section sponsored a field trip for the University of Illinois Student Chapter. The New England Section continued to play an active role in the affairs of the Connecticut Technical Council and held joint metings with the Yale University Student Chapter. The Western Section, due to its extensive geographical spread, continues to hold its position as the largest Local Section and held a full-fledged two-day Annual Meeting in Portland last June. Each Section holds regular meetings and is contributing substantial assistance to National Headquarters in the conduct of its expanded program.

The University of Illinois Student Chapter completed an active year which included an extensive campus traffic survey, development of a suggested traffic engineering curriculum for Civil Engineering students, a city-wide survey of the Champaign-Urbana City Bus Lines, and a field trip to Chicago under the sponsorship of the Midwest Section. The Yale Student Chapter attended several meetings of the New England Section and conducted the technical program for the Section at its Annual Meeting in May. A majority of the membership of this chapter have already submitted applications for various grades of membership in the Institute. A third ITE Student Chapter, at the University of Michigan, was officially authorized by the Board of Direction at its meeting earlier today.

Addendum

In closing this report, I would like to take this opportunity to express the sincere appreciation of your Executive Secretary for the sympathetic understanding, leadership, and helpful guidance of President Mitchell, the cooperation and assistance of the Board of Direction in the management of Institute affairs, the invaluable loyalty and assistance given him by the secretarial staff at National Headquarters, and the active support of committees, Local Sections and individual members.

Lives Being Saved By Better Lighting

More and more lives are being saved throughout the nation by eliminating a major cause of fatal night traffic accidents—inadequate street lighting.

According to the Street and Traffic Safety Lighting Bureau 13 cities report an average 82 per cent reduction in night traffic deaths by replacing Model T lights with modern luminaires.

Typical death reductions reported by cities which have improved street lighting include:

78 per cent in Grand Rapids, Mich., by relighting a 4-mile stretch of road leading into the city.

65 per cent in Hartford, Conn., by relighting 31 miles of streets.

80 per cent in Houston, Tex., by relighting 4.3 miles of a main thoroughfare.

91 per cent in Los Angeles by relighting 20 main intersections.

92 per cent in Salt Lake City by relighting a 3-mile stretch of thoroughfare.

75 per cent in Detroit by relighting a main street.

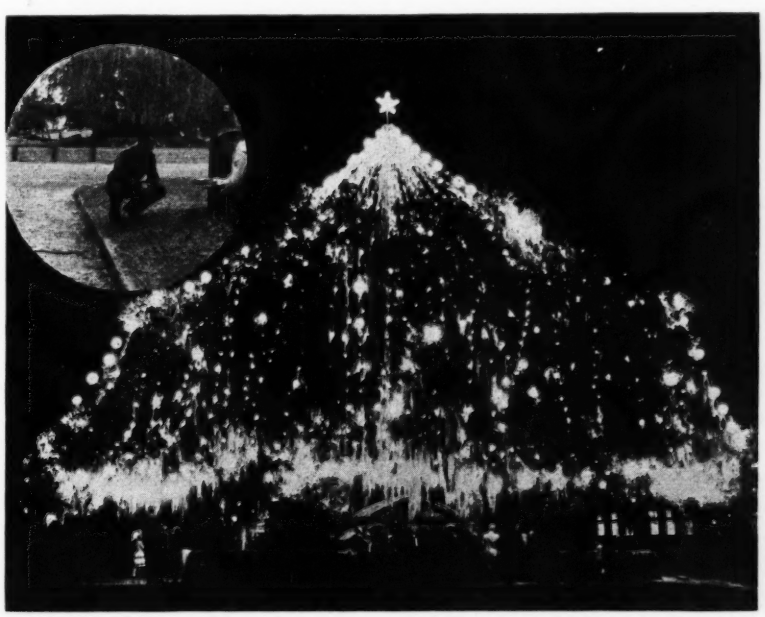
A reduction of only 54 per cent in night deaths would mean a saving of 10,000 lives annually for the nation as a whole the Bureau says.

K-Hill Counter Used to Check Christmas Traffic in Wilmington, N. C.

A traffic counter, supplied by the K-Hill Signal Company of Uhrichsville, Ohio, is used in Wilmington to count the thousands of cars that visit the *World's Largest Living Christmas Tree.* City Purchasing Agent Cartier stated: "The counter operates beautifully and we plan to use it in checking some of our traffic problems."

The Christmas Tree, considered the world's largest, was first decorated in 1929 under the supervision of the City Commissioner of Public Works. It is a magnificent Water Oak and is estimated to be over 300 years old. It is 75 feet tall and has a diametric spread of 110 feet. The first year the tree was decorated, 750 lights were used—it now has over 3600 multi-colored lights, and six tons of Spanish Moss.

Over 70,000 people visit the Christmas Tree during the three weeks the lights are on at the Yuletide Season and a warm and cordial invitation is extended to all visitors, from near and far, to visit Wilmington and see the Christmas Tree.



LOOKING AHEAD

January 23—February 10, 1950
LOS ANGELES, CALIFORNIA

Western Institute for Traffic Training. Los Angeles campus of the University of California. Institute of Transportation and Traffic Engineering, University of California, Berkeley 4, California.

January 30—February 1, 1950
LOS ANGELES, CALIFORNIA

California Institute on Street and Highway Problems. Los Angeles campus of the University of California. Institute of Transportation and Traffic Engineering, University of California, Berkeley 4, California.

March 9, 1950
WASHINGTON, D. C.

National Committee for Traffic Safety. Annual Meeting, Hotel Statler, Washington, D. C.

April 26-27, 1950
WASHINGTON, D. C.

National Highway User's Conference. Third Highway Transportation Congress, Hotel Mayflower. National Press Building, Washington 4, D. C.

Annual Meeting Sponsors

We have received word that one of the 26 official sponsors of the Institute's 20th Annual Meeting failed to receive due recognition by inclusion on the sign displayed in ITE Headquarters Room. Through an unfortunate oversight, International Meters, Inc. was not listed on this sign. Herewith our apologies and recognition of their valuable assistance in helping to make the 20th Meeting the most successful in Institute history.

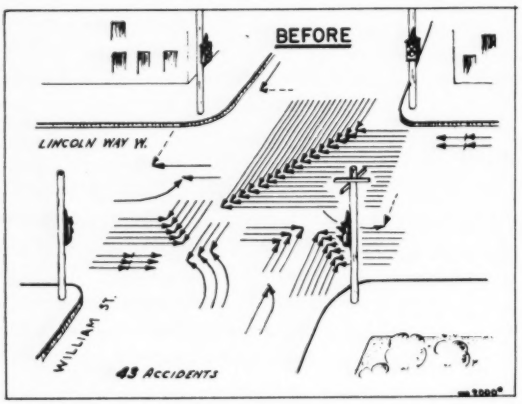
GETTING RESULTS

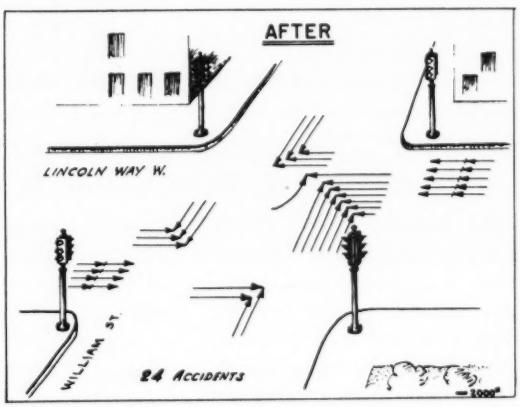
THROUGH TRAFFIC ENGINEERING

No. 5

TRAFFIC SITUATION No. 5
SIGNAL STANDARDIZATION CUTS ACCIDENTS

PROBLEM: Lincoln Way West and William Street was the second most dangerous corner in South Bend, Indiana, in 1936 and 1937. The fact that Lincoln Way West services also as U. S. Route 20, carrying much through traffic, aggravated the situation





ACCIDENT FACTS—In a 23 months' period prior to improvement, forty-three accidents had occurred at the intersection—one fatal, nine injury and thirty-three property damage, costing an estimated total of $14,350. All the accidents occurred while the traffic signals were in operation; thirty were right-angle crashes. A majority involved out-of-town motorists traveling on Lincoln Way West (U. S. 20), and were the result of "running" the red light and crashing into vehicles traveling on William Street.

FIELD STUDIES—Observation revealed that the signals at this intersection were of a non-standard two lens types, located on makeshift poles six inches below the minimum standard height, and that there was one signal facing for each direction. Over 10,000 vehicles went through this intersection on an average 12-hour day. Lincoln Way West, 52 feet wide, carried 72% of the total volume, and William Street, 40 feet wide, the remaining 28%.

SOLUTION—The traffic signals were changed from a two lens to a standard three lens, raised six inches and placed on standard signal posts. An additional signal face was installed for each approach. The cost of the improvement was less than $900.

CHECK BACK—In a twenty-three month period following standardization and improvement of the signals, accidents were cut to three personal injury and twenty-one property damage, a total of 24. This represented a 44% overall reduction from the corresponding period before the situation was corrected. Right-angle collisions registered an even larger drop—53%. The total saving, after writing off the entire cost of improvements, is placed at $11,500.

This is the third in a continuing series of selected "Getting Results" examples published by permission of the Accident Prevention Department, Association of Casualty and Surety Companies, 60 John Street, New York 7, N. Y. The Association's Award Committee will shortly determine the recipient of the $100 Cash Award for the best example in 1948 (p. 379, May 1949 issue "Traffic Engineering" magazine).

Example Contributed By

Ernest H. Miller
City Traffic Engineer
South Bend, Indiana
Junior Member, Institute of Traffic Engineers

Personalities . . .

WILLIAM S. CANNING, a charter member of ITE and a former member of its Board of Direction, is another "modest" individual. He is now serving his twenty-second year as Engineering Director of Keystone Automobile Club, operating in Pennsylvania, New Jersey, Maryland and the District of Columbia.

A registered professional engineer and a member of the Bar in Kentucky, Mr. Canning entered the service of Keystone in 1927. During the late war he held a commission in the Philadelphia Ordnance District, handling important traffic assignments in connection with industrial plants engaged in manufacture of war material. In World War I he was construction and area engineer for the duPont Company at the Old Hickory smokeless powder plant, Nashville, Tenn.

Before coming to Keystone, Mr. Canning was assistant maintenance engineer of the Pennsylvania Department of Highways, a post he held after working some years in a similar capacity in Kentucky and Georgia. Licensed to practice law in Kentucky, he became the club's legislative representative in Pennsylvania, New Jersey and Maryland. He has written and has participated in writing many parts of the Vehicle Code in this state.

He also served as consulting traffic engineer to the Pennsylvania Department of Highways in organizing the State Traffic Division and writing the regulations for street traffic signs and signals.

LESLIE J. SORENSON is so modest we were forced to beg, plead, cajole, coerce, and almost demand that he allow us to present his "sketch" to the public via "Traffic Engineering" magazine. We were particularly insistent because he was the only Past President of ITE who had failed to reveal his brilliant and successful career to our rapidly-growing list of members and subscribers.

Due to his extreme modesty, we were unable to obtain much factual data. However, we do know that he was born in Rhinelander, Wisconsin, on December 19, 1892, and completed four years at the University of Wisconsin in 1914. He immediately obtained employment with the City of Chicago, and until 1925 was Superintendent of the Sign and Signal Division. From 1925 to date, he has been City Traffic Engineer and Chairman of the Chicago Street Traffic Commission. On the last day of September 1949 he completed 35 consecutive years of service with the City of Chicago.

Les became a member of the Institute in October 1935 and recognition of his prominence in the traffic engineering field came a year later when he was elected Vice-President. He served in this office for one year and served as President from 1937 to 1939. His tenure of office brought additional prestige and recognition to the ITE; he contributed much of his personal time and effort toward the furtherance of the Institute's aims and objectives.

His long and active career is liberally sprinkled with important committee and executive assignments and a generous accumulation of achievement awards and plaques. He has been especially active in the affairs of the National Safety Council, holding many key assignments in connection with the Traffic and Transportation work of this organization. Currently, he holds the title of Vice-President for Traffic and Transportation. Among other important responsibilities, he is a member of the Joint Committee on Uniform Traffic Control Devices, representing ITE. He was also Co-Editor, with Harold Hammond, of the first edition of the "Traffic Engineering Handbook".

Les states that his greatest pleasures in living are his association with his family, and with friends and people. He loves the outdoors, and "hibernates" in the North Woods at every opportunity for a little vacation. He apparently spends most of his time on these sojourns fishing and hunting, and *occasionally* attempts a game of golf. We were unable to learn the extent of his prowess in these "extra curricular" activities.

ITE'ers Attend AASHO Traffic Committee Meeting

The following ITE members attended the meeting of the Committee on Traffic at the recent AASHO Convention in San Antonio, Texas: Vice-President **HARRY E. NEAL**, Ohio; Directors **C. W. PRISK**, Bureau of Public Roads; **HARRY PORTER, JR.**, National Safety Council; and **JAMES E. P. DARRELL**, Minnesota; **DAVE BALDWIN**, National Safety Council; **HARVEY BOOTH**, Arkansas; **EARL CAMPBELL**, Highway Research Board; **W. E. "SKINNY" DeYOUNG**, Automatic Signal Company; **FORREST GREEN**, University of California; **M. V. GREER**, Texas; **STU HAWLEY**, The Texas Company; **ED JOHNSTON**, Nebraska; **RALPH LUCKENBACH**, California; **GENE MAIER**, Houston, Texas; **CARL McMONAGLE**, Michigan; **GRANT MICKLE**, Automotive Safety Foundation; **RALPH SAWYER**, Maine; **MATT SIELSKI**, Chicago Motor Club; **WAYNE VOLK**, Wisconsin; **LIGHT YOST**, General Motors Corporation.

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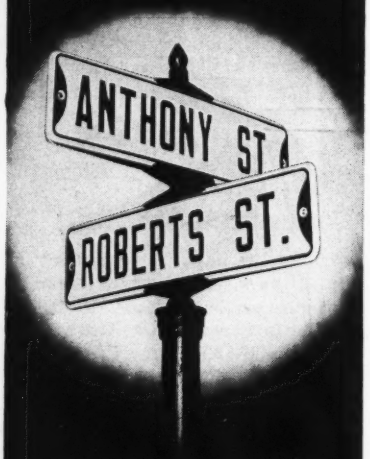

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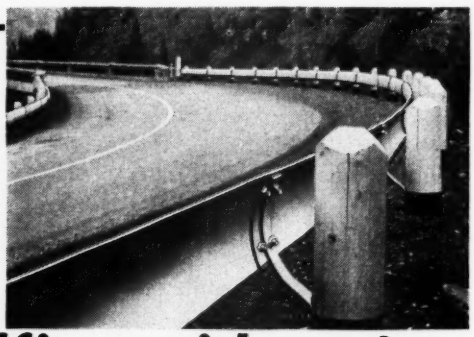

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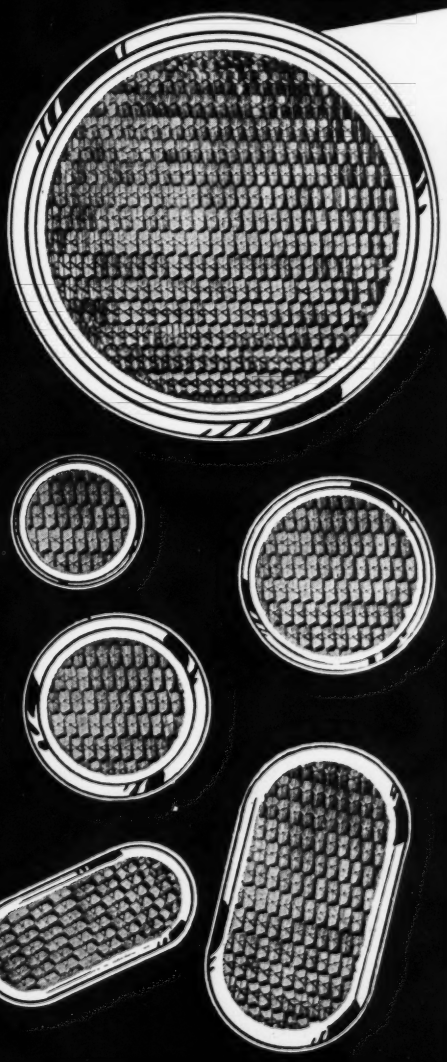

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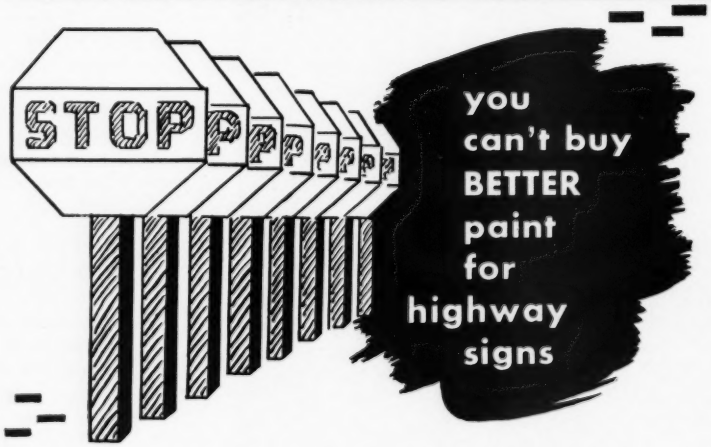

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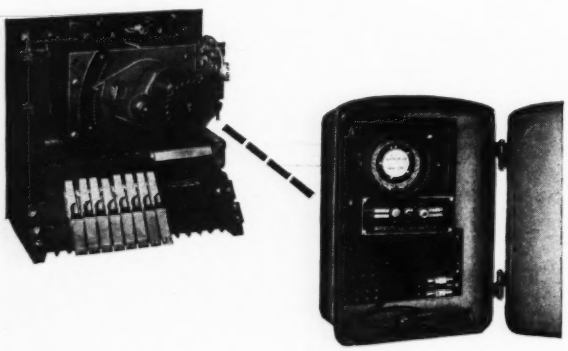

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(SIGNAL PREMIER, *Continued from page 129*)

The first traffic-actuated signal ever to be placed in public use was installed at the intersection of Falls Road and Belvedere Avenue.

time signal systems in the congested areas. The reason is probably economic because traffic-actuated apparatus costs several times more to purchase, install, and keep in operation. But such additional expenditure is insignificant compared to the cost to the motoring public by the unnecessary delays caused by fixed-time lights. This is especially the case at isolated intersections.

Murphy's Opinion

Charles J. Murphy, Traffic Engineer of Baltimore, told the writer that he believes that traffic-actuated signals should be used at isolated intersections to expedite traffic, and also at bad curves and approaches to cities to control automobile speed. He feels, however, that the progressive fixed-time systems in the downtown areas are doing a good job.

At present, Baltimore has only two traffic-actuated installations in service. They are both speed controls, one of which is on Falls Road at Mount Vernon Mill, and the other is at the approach to the city on Edmondson Avenue. The Falls Road light, when installed on December 12, 1936, was the first traffic-actuated speed control in the world.

Actuated Signals Best

Atlanta, Georgia, recently installed an elaborate traffic-actuated progressive signal system in a congested area, with gratifying results. Jacksonville, Florida; New Haven, Connecticut; Charlotte and High Point in North Carolina; Greenville and Columbia in South Carolina; Richmond, Virginia; Memphis, Tennessee, and other cities are using some traffic-actuated systems. City officials, more and more, are beginning to realize that the traffic-actuated signal is the remedy for the ludicrous situation wherein a blind timing mechanism arrogantly orders human beings to halt and wait, regardless of necessity.

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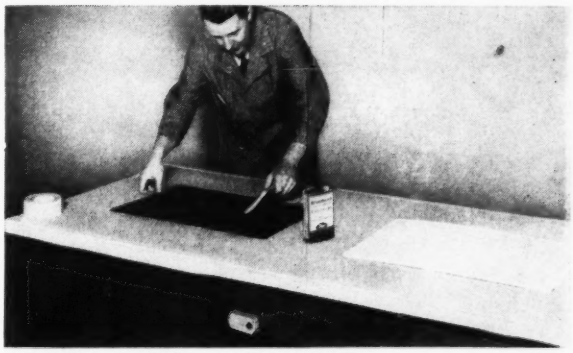

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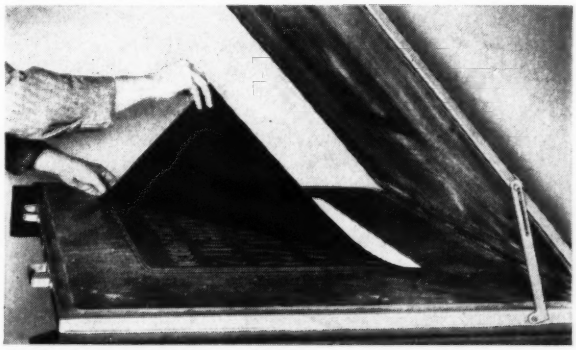

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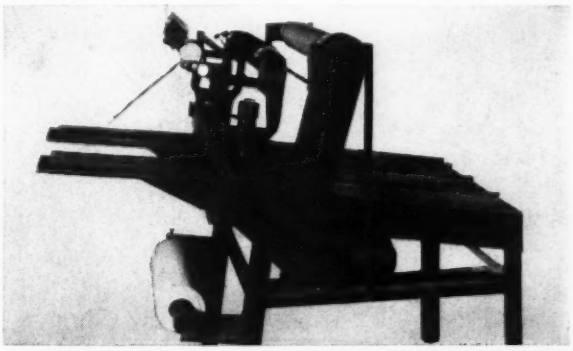

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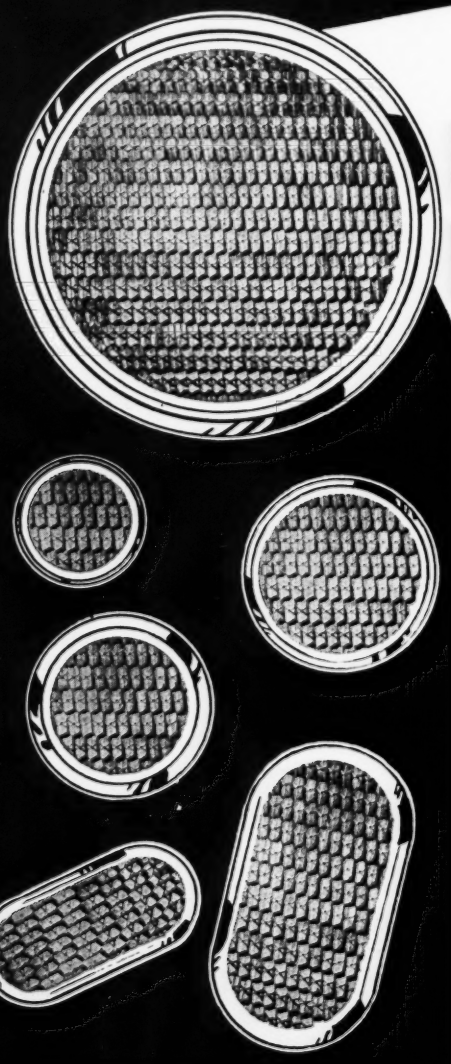

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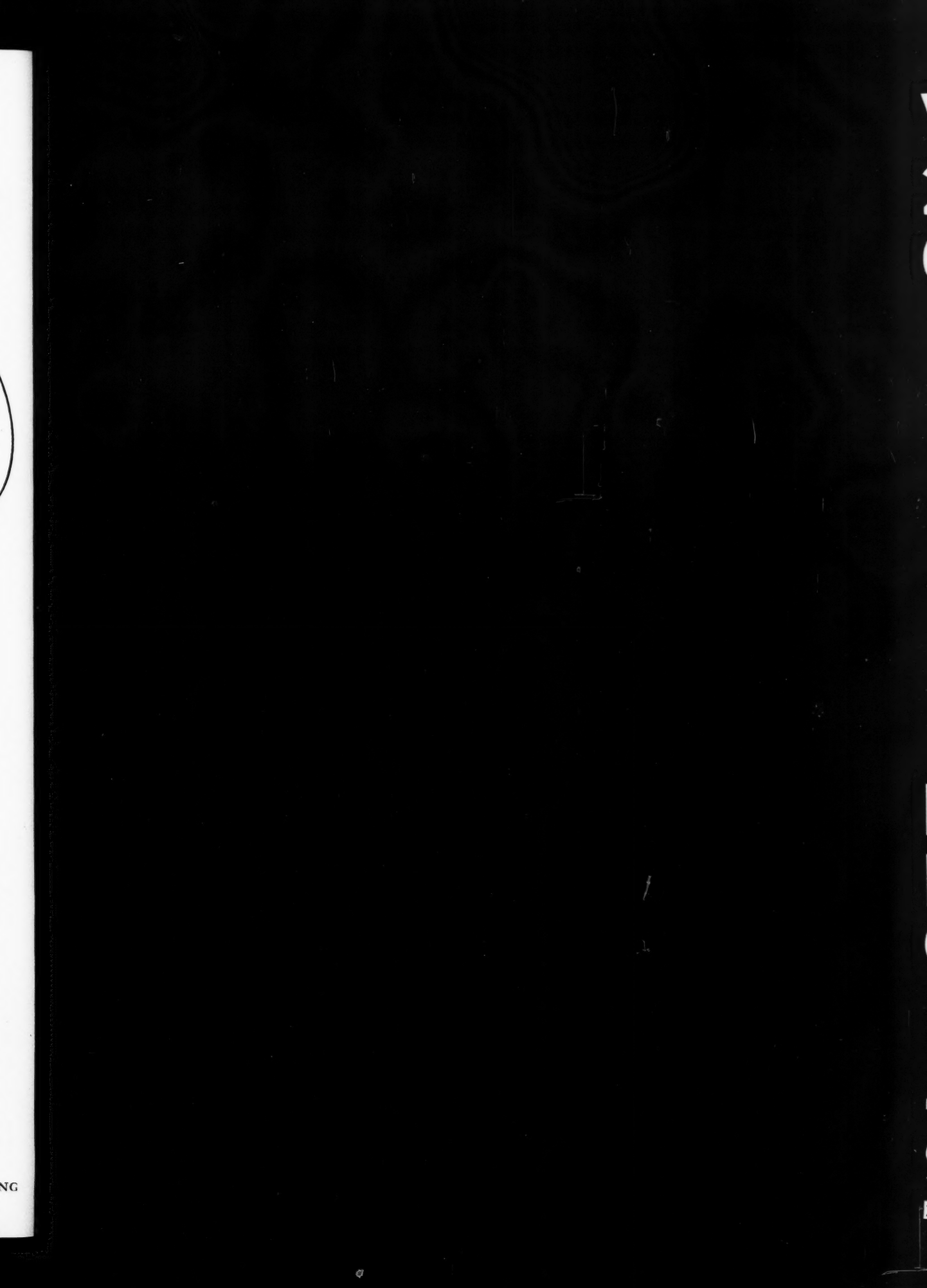
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